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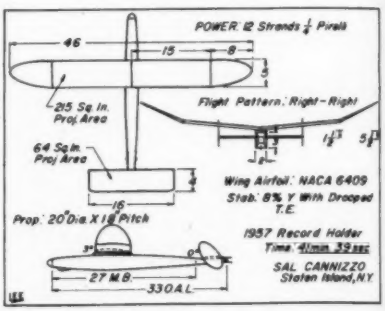

The annual meeting of the FAI International Model Aircraft Committee was held at Paris in November. The agenda is prepared in advance so that those countries that cannot send representatives may express opinions on the various issues. When the prepared agenda was received at AMA headquarters, copies were sent to all Contest Board members to vote on. The outcome of the vote will be our official view on the proposals. However, as past experience shows we cannot know what will be brought up directly at the meeting from the floor. Having a representative there in person is a decided advantage. Written suggestions from countries not attending can be easily overlooked and by-passed unless there is someone there to champion the cause.

The meeting will thrash out the every-other-year routine in regards to the finals, and there could well be changes. England will ask for the Wakefield cup back if it is not put on a yearly basis and, if it is put on a yearly basis, Sweden has signified she would then exercise her right to hold the Finals next year. This could alter England's plans to hold the double contest in 1958. Netherlands is proposing additional Championships for Radio, Stunt, and Team Racing. Italy proposes changes in tow-line length from 50 to 70 meters, and increasing the weight slightly. Indications show much support for the plan not to alter the regulations during the next four years. A detailed account of the results of the meeting will be forthcoming.

This month we give you a three view of the model flown by the top member of our Wakefield team. Sal Cannizzo turned in five perfect flights and made a sixth flight to establish a new high record. "The models seem to fly just as good on 50 grams of rubber as they did on 80," said Sal.

Sal's model is very short, has skyrocket climb. It is tissue covered. None of Sal's flights were close to three minutes but were rather near the four-minute mark. Height alone does not produce such high times. We haven't seen a much better glide. Light structure required ballast to bring it up to required weight. Ballast located in the bottom of the fuselage at the CG helps stability. Sal's flights were made at the East Coast semi-finals held at Somerville, N.J.

ED DOLBY

International Competition Committee

29th Year of Publication

MODEL AIRPLANE NEWS

M.A.N.

JAY P. CLEVELAND, President and Publisher

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by William Winter

► All is not quiet along the Potomac. In the national headquarters of the Academy of Model Aeronautics there is hectic preparation for the biggest and "best" crisis ever, the 1958 Nationals, to be held, July 21-27, at Glenview Naval Air Station, Ill. Problems are two: events and personnel; too many of the former, too few of the latter. As MAN at Work remarked two months ago, the 1957 Nationals taxed the facilities of the U.S. government and swamped the AMA people. Events are forever being added, but none are ever dropped. Thirty-eight events and nearly 500 prizes in over 90 areas of competition. Monstrous, wasteful, stupid.

"The number of personnel available to both AMA and Navy is becoming a problem which is almost insurmountable due to the vast number of events scheduled," states a recent memo from Headquarters to the Contest Board members and the Executive Council. "Each air station has only a specified number of men who can be assigned as timers, judges, etc. During the meet, these men must stand fire watch, their own departmental security guards, traffic control duty, in addition to being on the field ten hours a day. The more events, the larger the requirement for manpower—often unavailable; thus, the events and the contestants suffer."

During the '57 affair, the Navy boys topped the modelers in the no-sleep derby, a significant achievement but, and wouldn't you know it, the modelers did all the bellyaching. You've got to be shocked at the sight of truckloads of men waiting all day to handle a few dozen flights in some off-beat event, while still more events are added, and basic, popular events have to be combined.

Nor is Navy manpower the sole limitation. In the various areas to which the Nationals is rotated, there is a noble tendency among AMA leaders and officials to say, "Let George do it." Modelers are reluctant to work on the Nationals—even the ones who get paid. Organizing and running this giant meet takes time, effort, and energy. Few AMA officials have the time to devote to what the AMA aptly terms "this monumental project." The work starts in the early spring and does not end with the awarding of the trophies.

What is the minimum requirement for AMA personnel? Starting at the top, there are the Contest Manager, the assistant (Continued on page 60)

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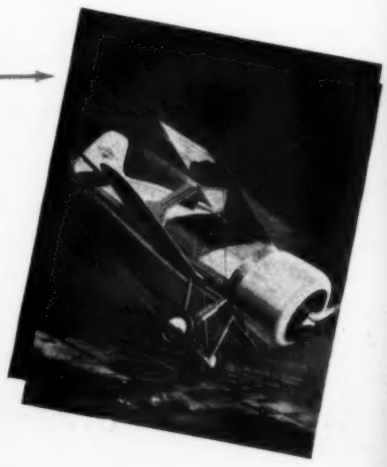

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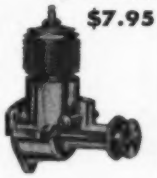

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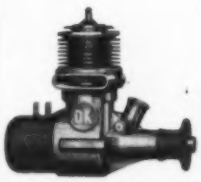

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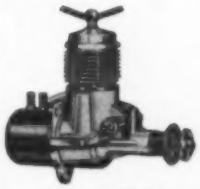

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Knocks off 115-120 mph in tests, says author, of his graceful Mono-line, Fox 29R airplane.

No sky-rocket take-offs, no vices. But it is a contest model from the word go—and not easy.

FAST MILER

by ED RANKIN

Metal pan has it all over wood mounts—better cooling, accessibility. Here, designer shows removable design. Plenty of room for the pan-bladder tank; a squeezed tank gives false set.

Speed jobs too small? Want to fly fast? This Proto job beautifully designed, beautifully built, flies like a dream. Masterful directions add to any builder's skill.

ARE you a speed modeler who has grown tired of small speed models and would like to get out of the rut? Are you an experienced modeler who has had a fancy to build a speed model but didn't want to get into the professional "rat race"? If you fulfill any of these requirements, the Proto Speed event is for you. If you are looking for a sure-fire combination for a proto model, the Fast Miler companioned with the Fox 29R is the model to build.

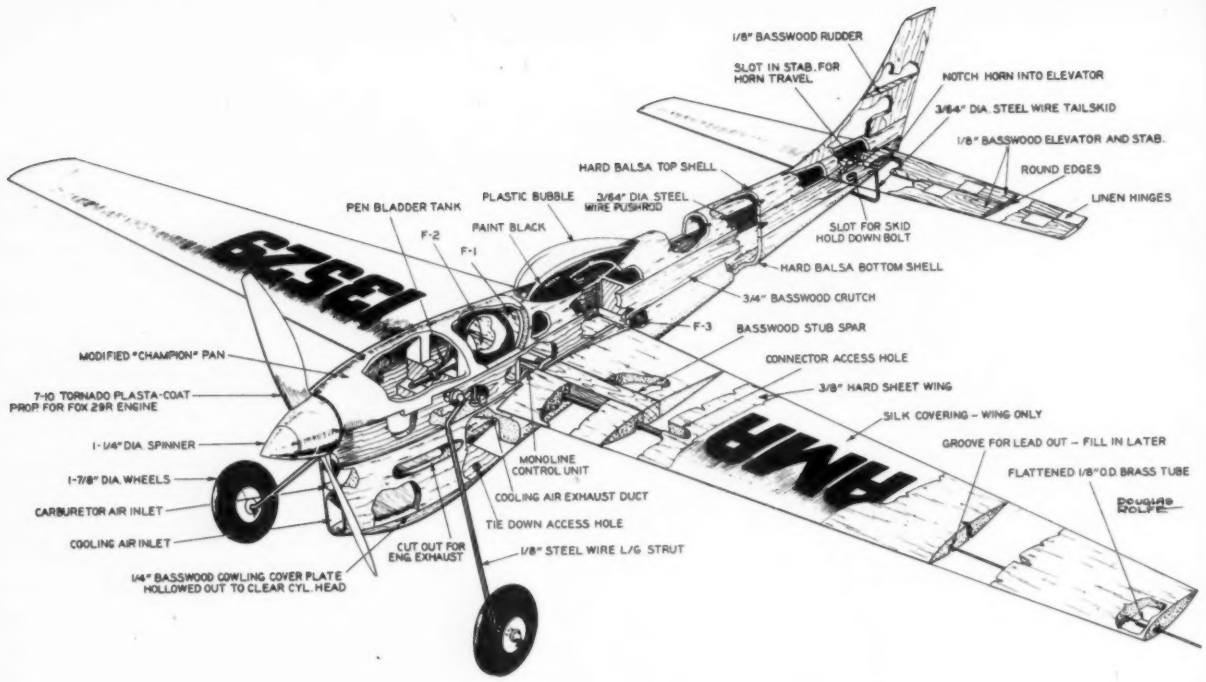
A note to the novice—this is not a beginner's model nor is it easy to build. It is strictly a contest model.

The Fast Miler was designed for stability in high winds that are so characteristic in Texas. This was accomplished with compatible moment arms that were coupled with proper wing and tail areas. This was then companioned with high aspect ratio on wing and tail surfaces. One of the most desirable qualities of this model is the absence of "sky rocket take-off" which is death on Proto models. This is accomplished by having the wing located below the thrust-line. There is a controversy over fast climb on take-off, but, believe me, I have seen many fast potential winners that were unable to make an official flight in a contest because the model would either come in toward the pilot on the ground or sky-rocket on take-off and lose control. It is important to take off quickly but still have control of the model. There is more advantage in taking off quickly and holding the model low to the ground to get benefits of "ground effect" that reduce induced drag than in climbing as fast and high as allowed for this event.

In designing this model due consideration was given to strength and durability because vibration from high speed engines will wreck a poorly constructed model. This was the reason for using a full–length basswood crutch with hollowed balsa blocks for fuselage construction. One of the main features of the model is the use of a half metal pan for the engine to mount on. This gives added strength and durability and proper heat dissipation for the engine.

Naturally, aerodynamic considerations were given to the model—namely, high fineness ratio on the fuselage giving low profile drag and high aspect ratio on the wing reducing induced drag. Since it is a proven fact that most of the total drag of lines plus airplane is in the lines, Mono-line control is a "must". U-Control could be substituted but with a resulting penalty in speed.

The Fast Miler not only looks fast but is fast. The model has ideal take-off handling qualities. There were some difficulties experienced in making good landings on the first two versions



of the model, but this was thought due to a too far forward balance point. After this was corrected, landings were smoothed out.

I have built three of these models with resulting improvements in each. The first two were slower. Speeds on the Dooling powered models were relatively low compared to the Fox powered model. With my Dooling engine the model clocked from 104 to 109 mph. The model placed second at the 1956 Nationals with 104.50

With the Fox-powered model, speeds started at 110 mph, and now the model is doing 115 to 120 mph in the test flying. It has won first place at several contests here in Texas with speeds of 110 to 112 mph. Naturally, record trial attempts have been made, but we have been plagued with wet weather here in Texas which is not conducive to good engine runs.

The first model had the engine mounted on wooden mounts, but the engine seemed to overheat excessively with that arrangement. Since engines in speed models seemed to run cool enough in metal pans, a metal half pan was adapted to the proto model. The engine no longer overheated. An added advantage was complete accessibility. Other improvements were CG relocation and frictionless controls.

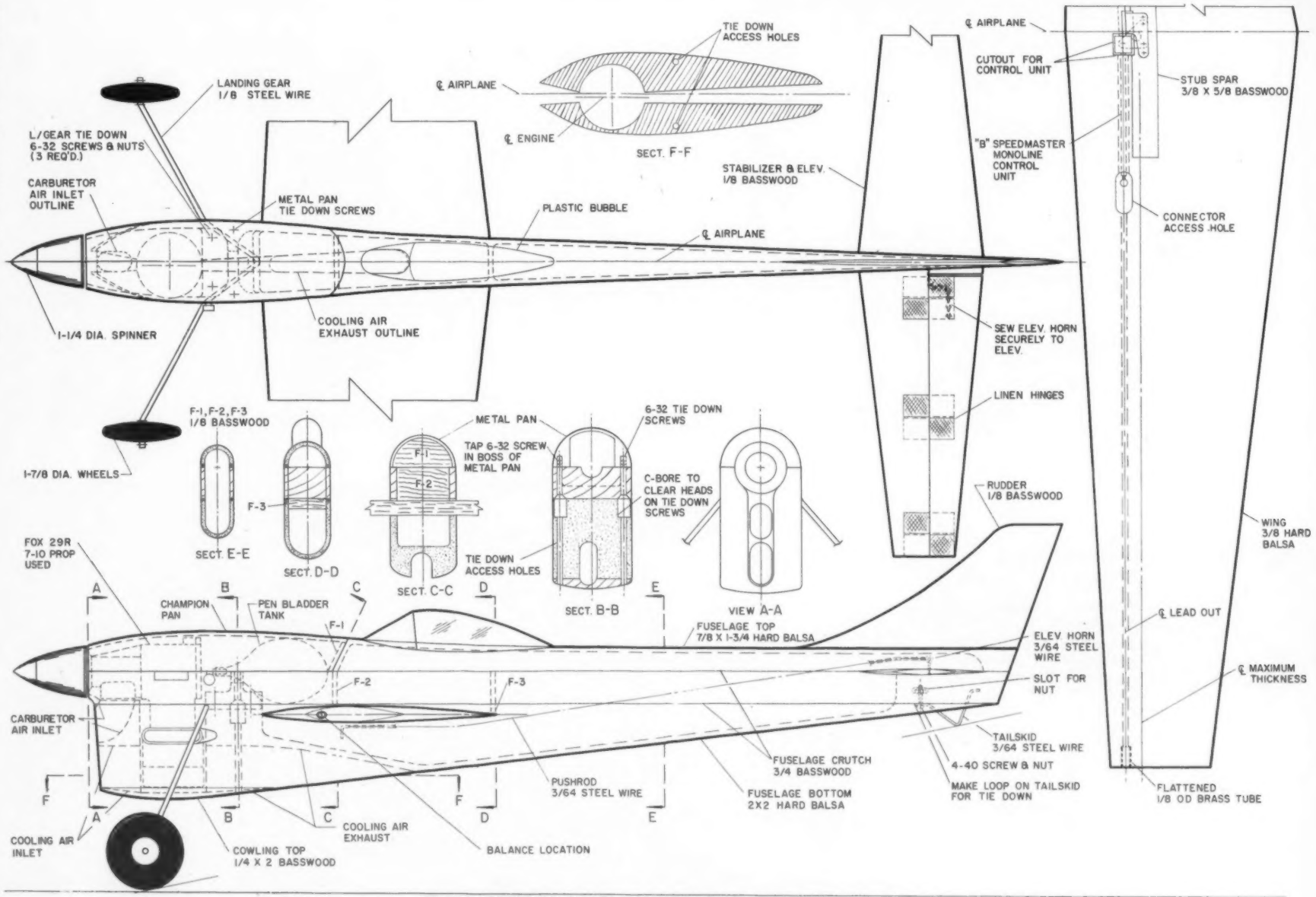
*FUSELAGE*s File and sand the metal casting pan to proper size and smoothness. A Champion pan was used, but any other metal pan could be substituted. Use a regular automobile body file and take the metal down so that no pits show. Then use a heavy grade of emery cloth wrapped around a hardwood block to sand the pan to a rough finish. Next, use #320 wet or dry sandpaper to remove scratch marks left by the heavy grade emery cloth. Use #400 wet or dry sandpaper to polish to a brilliant finish.

Trim the pan to the proper length. The length shown on the plans was chosen because the Champion pan narrows toward the rear and has to be faired in with the lines of the fuselage. Also, there must be room left for the pan-bladder tank. Drill and tap #4-40 holes for engine tie-down, and use #4-40 flat head screws with a Phillips head recess to mount the engine. Do not drill and tap the fuselage tie-down holes at this time.

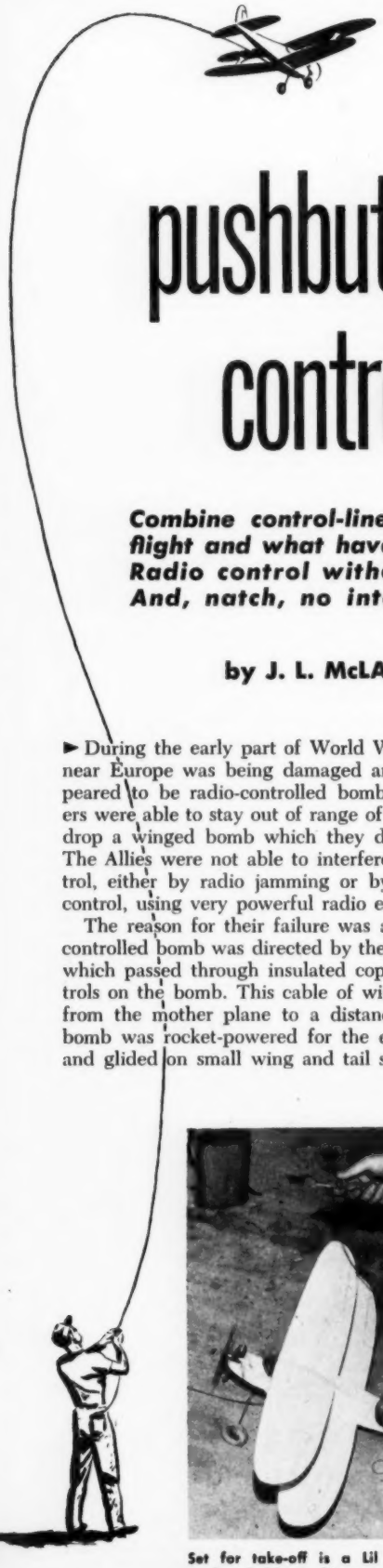
Lay the half pan on a piece (*Continued on page* 29)

Sleek fuselage cuts down profile drag. The finish! That's the painstaking ritual but results are worth it. It is really fuel proof.

Speed model construction practice is best, of course. Half Miler uses Champ pan and crutch but you can substitute any acceptable pan.



FULL SIZE PLANS AVAILABLE. SEE PAGE 56.



pushbutton control

Combine control-line and free flight and what have you got? Radio control without radio! And, natch, no interference!

by J. L. McLARTY

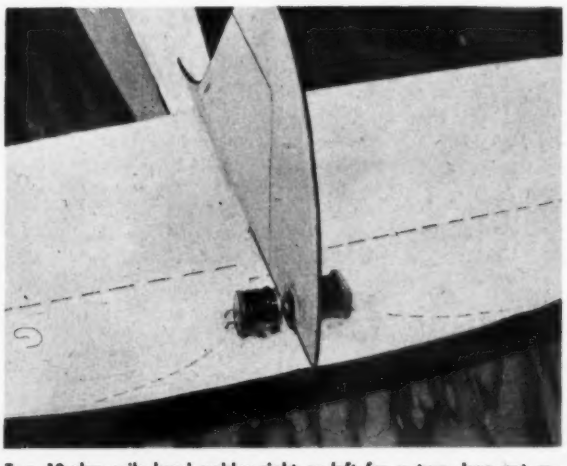
► During the early part of World War II Allied shipping near Europe was being damaged and sunk by what appeared to be radio-controlled bombs. The enemy bombers were able to stay out of range of the AA fire yet could drop a winged bomb which they directed to the target. The Allies were not able to interfere with the bomb control, either by radio jamming or by trying to take over control, using very powerful radio equipment.

The reason for their failure was a very good one. The controlled bomb was directed by the bomber using signals which passed through insulated copper wires to the controls on the bomb. This cable of wires could be unreeled from the mother plane to a distance of five miles. The bomb was rocket-powered for the early part of its flight and glided on small wing and tail surfaces to the target. Study of captured film indicates that a proportional type of control was used and that the percentage of hits was quite high. Fortunately, Allied bombers destroyed the manufacturing site of the glide bombs before many had been used.

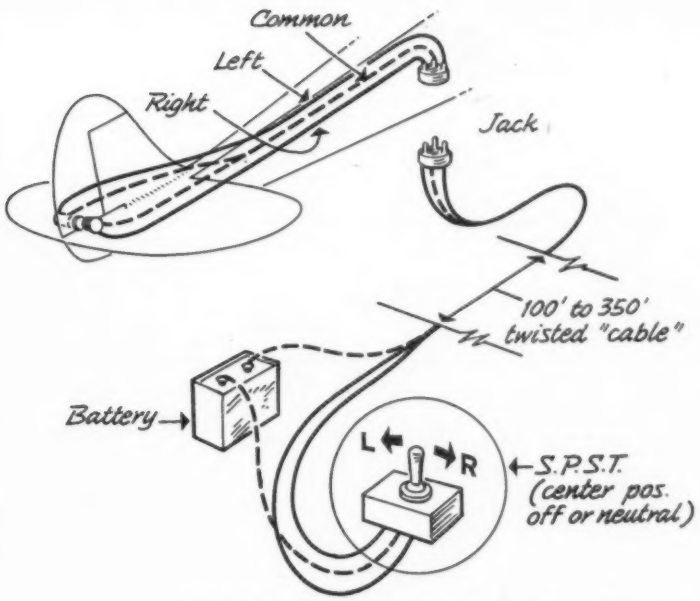
The control system of the plane in the accompanying pictures was inspired by a showing of enemy films but was actually based upon similar work with a cable and solenoid operated controls on a large free-flight about 15 years ago.

The system, in brief, is to use copper wires instead of radio waves to carry signals between the ground operator and the model's control system. To install this system in an RC plane, a two-wire cable of No. 30 Formvar or nylon-covered copper wire with a two-strand length of

Set for take-off is a Lil Rascal with two wings. Author holds pushbutton in right hand—gets set!



Two 10-ohm coils bend rudder right or left for a turn. Iron nut cemented between them in rudder. And you know how a magnet works.



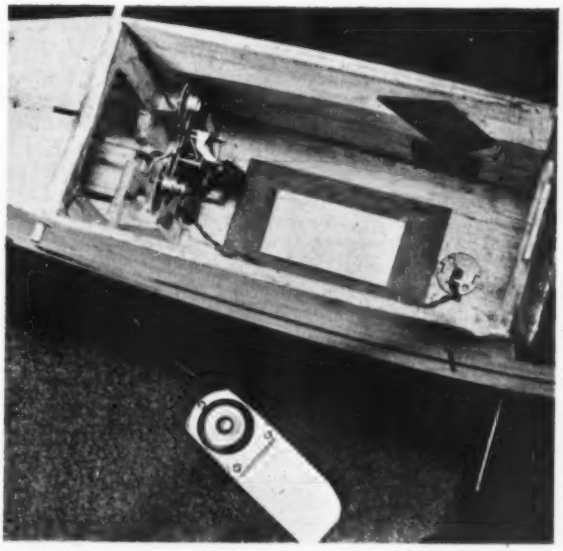
ABOVE—The control system. Single position, single-throw switch closes circuit with battery to energize the rudder-control coils.

LEFT—This happy Live Wire Trainer climbs into the blue with empty cabin. Can operate through receiver relay or, more juice, direct.

100 to 200 feet can be plugged into the bottom of the model slightly ahead of the center of gravity and connected directly to the radio receiver relay. The receiver and its battery should be removed or by-passed A 22½ volt battery with an on/off SPST switch at the operator end of the cable will operate a 4,000 to 8,000 ohm relay with some two to three MA current in the model. A greater number of wires in the cable will permit other controls to be operated directly. If the radio relay and its battery can also be by-passed, then higher voltage and/or heavier wire such as No. 28 or 26 can be used to operate the model's actuator directly.

The model shown is built for slow flying; it consists of a Carl Goldberg designed "LIL RASCAL" of 27" span with a second Rascal wing at 2° less angle of attack on the fuselage bottom and 2¼ inches to the rear of the upper wing. The V strut of the kit is replaced by an I strut. Large diameter wheels further aft than those of the kit are used to improve take-offs and landings and a huge intake restrictor is used on .049 engines to reduce power. A simple eye dropper is used as fuel tank and timer.

The control system includes 10-ohm escapement coils mounted on the elevator approximately 5/32 apart with a 1/8 thick soft-iron nut cemented between them on the rudder. The fin portion of the vertical stabilizer is cemented but the rudder portion is left free to be warped by the action of the coils into left or right rudder. The balsa rudder will return to neutral by itself. One lead from each coil can be common. This makes necessary a three-wire cable. When No. 30 enameled wire is used to make a 100 ft. cable and each coil resistance is 10 ohms, then 30 volts produces one amp current through the coil which is enough to operate the rudder. Using No. 32 enameled wire to make a 100 ft. cable (it will take 300 ft. of wire to make the cable) means that a 45-volt battery is required to give one amp current through each coil. A hand or electric drill can be used to twist the wires together into a cable: 1,200 turns for example, will put a twist



Doorbell type control switch here operates direct a Bonner escapement. The radio and its batteries removed. Cascade it? Gorsh.

every inch along a 100 ft. cable and keep the strands from separating. A SPST switch with center off such as Cutler-Hammer No. 7502-K 13 is mounted on a broken prop which serves as a handle. A three-prong connector is cemented about one inch forward of the CG on the bottom of the fuselage. The battery can be in the operator's pocket and can be one which is near the end of its life as far as radio use is concerned.

Operation of the control with this small model should begin with low-powered free flights minus the cable. When a slightly climbing, with good straight gliding, flight pattern has been established, the cable should be connected and the control *(Continued on next page)*

Pushbutton Control —continued

operation checked. If higher than 30 volts is used and the cable is very wet, it is desirable to bake the cable in a 150° F oven for about half an hour to reduce power losses. There are two methods at least of take-off procedure that are satisfactory; the first is the operator-launched type where the cable is laid in a straight line in direction of take-off and comes back on itself to the plane. The operator launches the model near to and parallel with its own cable. The second hand-launch type take-off is accomplished with the cable laid out in the same manner but the plane is brought 10 or 20 ft. back of the operator who bends down before the plane is hand launched toward him. The launcher in this case should be practiced and trustworthy. With either type of launch the operator has about half the cable length in which to make the model turn or become a free flight.

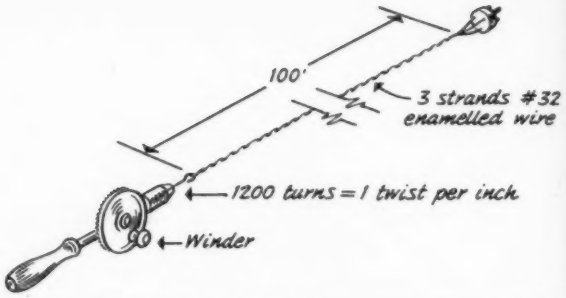
The Dmeco trainer uses a two-wire cable system of 350 ft. length. A Bonner compound escapement and varied holes from jacks, switches and antenna is all that remains of the control equipment. Power is .075 Cub diesel. Wing loading is now a wear-and-tear saving 9½ ozs. per square foot. Three inch airwheels are used on grass but 3½" or 4" wheels with a more narrow tread would provide better take-offs—the narrower the tread, the more prone to ground looping and more responsiveness to rudder control.

A doorbell type push button switch is use to pulse the escapement. When the "doorbell" rings twice you get left rudder. With the Bonner compound the third position with the switch can be used to stop the engine or slow it down with a solenoid choke type of control and batteries in the airplane for power. If an escapement without switch is used, another line can be used with a separate switch on the ground without any batteries required in the model.

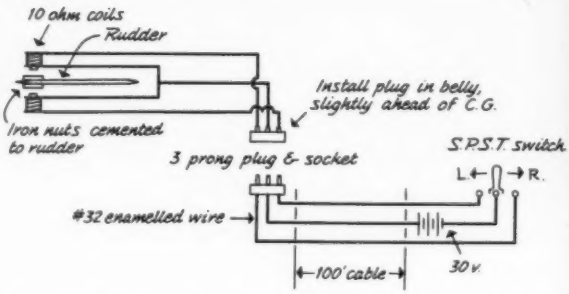
The cable of 350 ft. length consists of two No. 30 nylon-coated copper wires twisted; 45 volts in the operator's pocket gives the compound escapement coil over ½ amp current whenever the button is pressed. With the high voltage used, some attention should be given to insulation since escapements were not designed with more than 4½ volts in mind, although most switches, plugs and all escapements that we have seen will take the pressure.

For long cables, snag-free flying territory is difficult to find. Unless a golf course, airport runway, lake ice or smooth snow can be used, frayed and broken cable will have to be repaired or discarded. Fortunately, copper wire in these sizes is inexpensive.

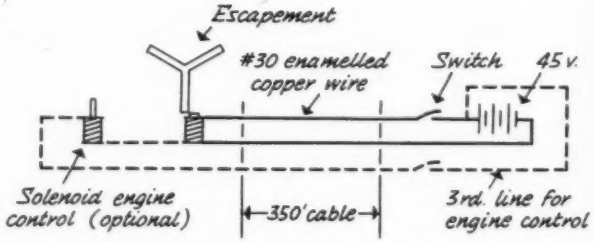
Very small models, with rudder, elevator, aileron and engine control using the very small engines such as the Cox .020 should also be possible.



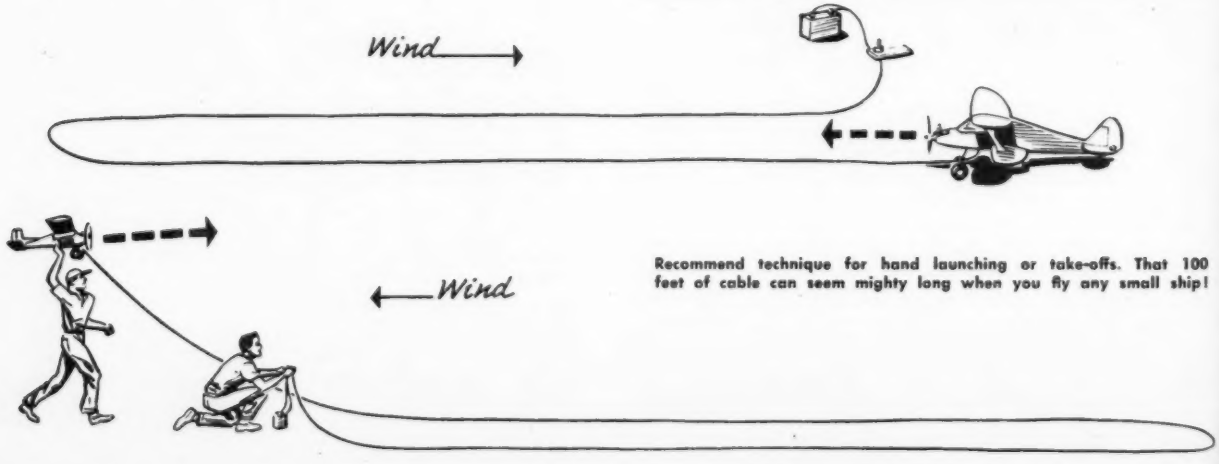
How the cable is made up. Enameled wire prevents shorting of current sent to the airplane to operate rudder. Ukie fans: ideas?



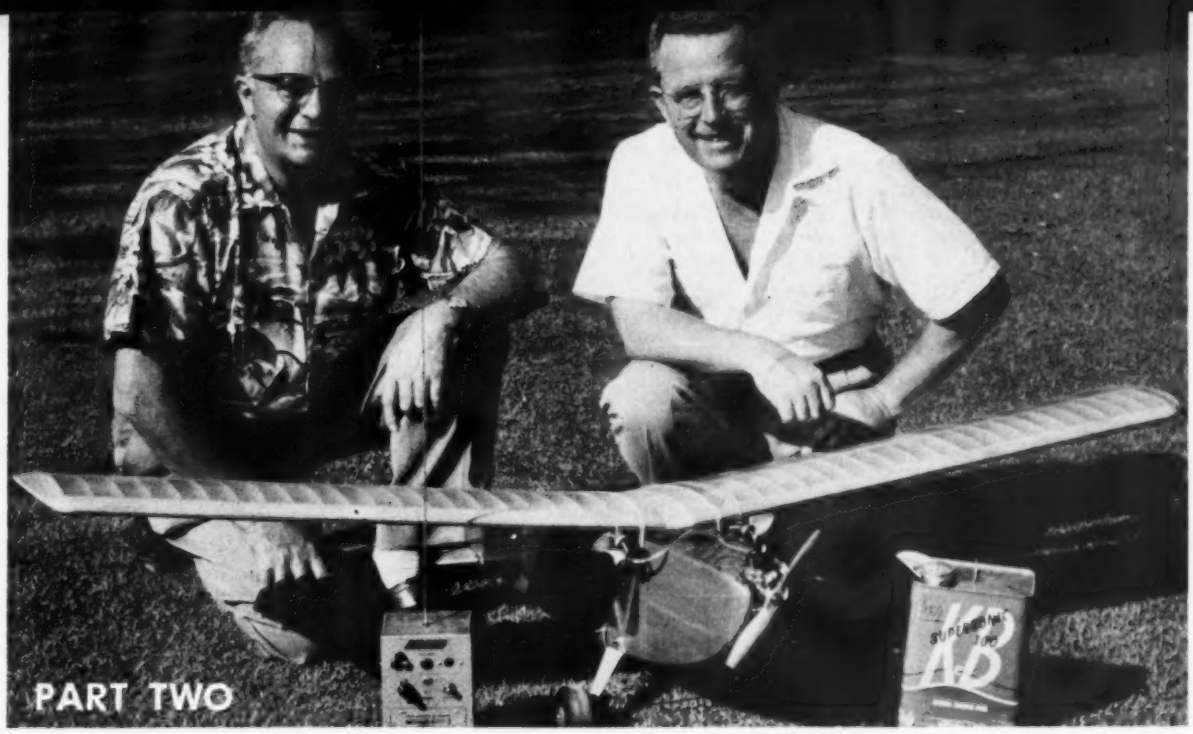
Upper half of the schematic represents the airplane end of the system. Lower half, from battery and switch, up to the airplane.



Schematic for escapement installation. Note the third line on engine control. Extra controls can be worked by batteries in plane.



Recommend technique for hand launching or take-offs. That 100 feet of cable can seem mighty long when you fly any small ship!



What a relief! Bill Glick, left, and Ken, with the scaled up Breathless after the successful Channel crossing. Common-sense airplane.

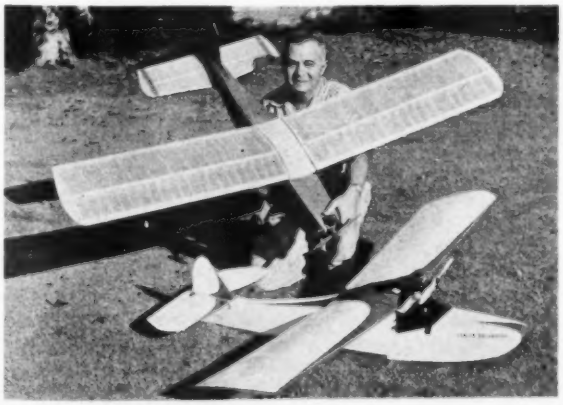
Flight To CATALINA

by KEN WILLARD

The never-say-die spirit finally pays off in a memorable over-water flight climaxed by a "victory" loop high over Avalon harbor.

► For the next Catalina Channel attempt, we decided on two-channel equipment. Although reed receivers were successful, there was the possibility of moisture effecting the reeds. We also feared interference in the Los Angeles area.

About this time, Babcock Models came out with their two-channel transistorized 465 mc receiver. This looked like a natural. If somebody was operating the same type of equipment, they would have to be within a half mile to interfere. The airplane would be set for a wide circle, then, in the course of the flight, an occasional command would put the ship in a turn opposite to its natural turn; then, allowed to free flight, it would gradually straighten out and revert to its natural turn. Thus, we would be able to maintain a gentle S pattern; also, if the airplane should get out of range, it would go into a wide turn and we could set the chase boat on an intercept course and get back in range.



Avalon Dreamboat, foreground, second of three airplanes used in the attempts. Blick Glick holds the big Breathless landplane. Used K&B .15.

We decided to use two escapements, one for elavator and one for rudder. The third position of the rudder escapement would be wired to a Babcock motor servo with the wiring set up so that it actuated the servo in one direction. The third position of the elevator escapement would be wired to run the motor servo in the opposite direction. Thus, with the servo connected to the arm of a Bramco throttle, we could beep in motor speed control and achieve an infinite number of settings. By using the lighter radio we were reducing the overall weight, the power, and the fuel load.

Some of the racing boys had been getting good fuel economy with the K & B .29, as good as some of the .19's and .23's. So we selected the K & B .29.

In a surprisingly short time we had the structure back together again. In rebuilding the center section of the wing to accommodate a smaller engine, we were able to save some more weight. We designed a removable radio, battery, and motor servo unit with quick connect plugs leading to the antenna, escapements, and the switch. The empty weight came out at 5½ lbs., a saving of about 1 lb.

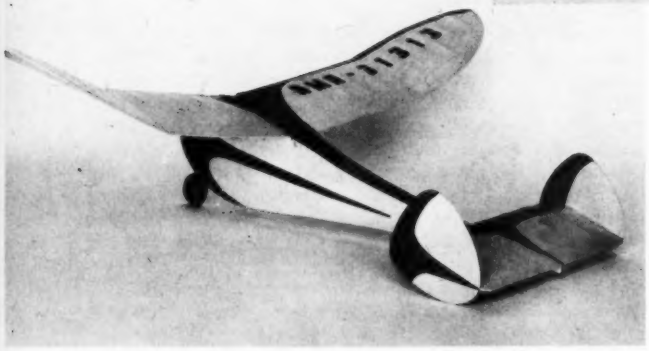
Since we had gone from the .35 to the .29 engine, and there was a difference in the fuel draw, we ran some tests to see if the simple balloon tank would work. It was too critical at cruising rpm's, so we went back to the pressure tank and fuel regulator system. Although there was plenty of room in the hull for the tanks, we made some detachable wing tank fixtures. We used four toy balloons, each one of which would hold about five or six ounces of fuel, and interconnected them with T (*Continued on page* 46)

pee wee pal

by WALTER MUSCIANO

What the modeling world needed—a really small engine—it finally got. This .02 deserves a decent crate—here! No quick freak but an honest-to-goodness airplane.

The 18th variation of the same basic design by the author, Pal is as tried-and-true as you can get. It is the right size for sport.



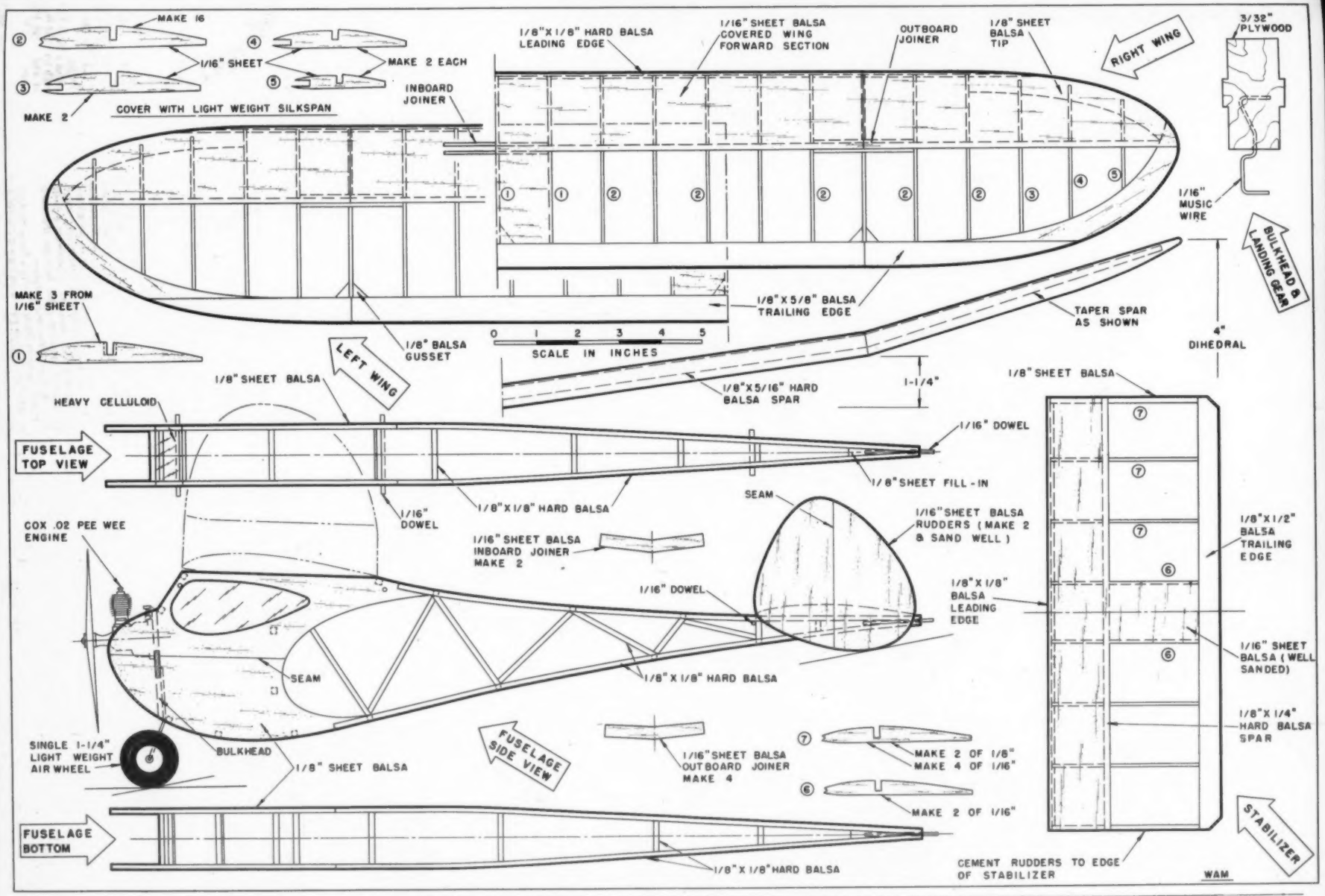
Twin fins and single-wheel gear make cabin model just different enough. Covering is light Silkspan, watershrunk—color if you like.

► This Cox Pee Wee .02 engine powered free flight model is the 18th version of one basic design that the author has constructed and flown. Our Pee Wee Pal is the smallest of the family of which the largest was a giant eight footer. The uncanny ability of every model, regardless of size, to be stable and ride out any violent air disturbances, and yet be peppy enough to win numerous prizes in several classes, has caused us to call this youngest member of the group our "Pal", hence the name.

Although earlier versions used the NACA 6409 airfoil, we found that the Clark Y airfoil produced equal results in the smaller models. Stabilizer airfoil is Clark Y with a thickness of 9% of its chord. The wing area of 144 sq. ins. is ideal for the Pee Wee .02 engine. However, any Half A diesel or glow-plug engine can be installed.

Construction begins with the fuselage which has a rectangular cross section composed of a sheet balsa forward section and a Warren Truss (cross pieces run diagonally—Editor) framework for the remainder. Construct the side frames in the conventional manner including the sheet-nose portion. The longerons and sheet portion are pinned down on the plans. Place wax paper under the work to keep it from sticking to the paper. Use a single edge razor blade to cut the cross pieces to size and then cement them in place. Put cement on the ends of the cross pieces, touch each end in place; then put on more cement and slide into position. You can make one side at a time or both together, one over the other. If you make two at a time, you will have to slide a double-edge razor blade between the sides later (at all the joints) when you lift them from the bench. After the sides are done, use pins and cement to attach the cross pieces (take out pins when dry), at the widest part of the cabin, that connects the two sides. Check alignment with a triangle or other suitable object. When dry, pull together at the tail, cement, then place the remaining cross pieces, and so on.

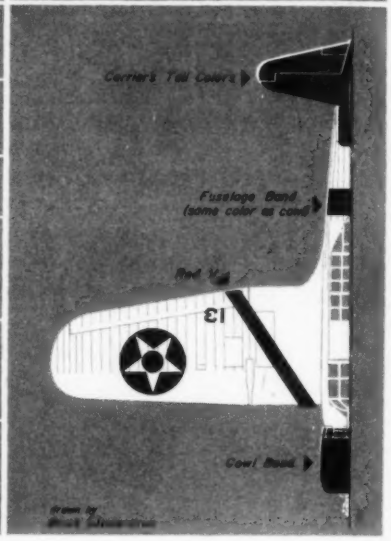
Be certain to cut the slot in the nose portion for the tongue of the plywood bulkhead. We always consider it good practice to sand each piece *(Continued on page 40)*



FULL SIZE PLANS AVAILABLE. SEE PAGE 56.

TABLE I—TAIL IDENTIFICATION COLORS

CARRIER	TAIL COLORS	AIRCRAFT CARRIED IN JUNE 1940
U.S.S. SARATOGA	WHITE	VOUGHT SB2U-1 VOUGHT SB2U-2 GRUMMAN F3F-1 CURTISS SBC-3 DOUGLAS TBD-1
U.S.S. LEXINGTON	LEMON YELLOW	VOUGHT SB2U-1 VOUGHT SB2U-2 GRUMMAN F2F-1 CURTISS SBC-4 DOUGLAS TBD-1
U.S.S. YORKTOWN	INSIGNIA RED	NORTHROP BT-1 GRUMMAN F3F-3 CURTISS SBC-3 DOUGLAS TBD-1
U.S.S. ENTERPRISE	TRUE BLUE	NORTHROP BT-1 VOUGHT SU-2 VOUGHT SU-3 GRUMMAN F3F-2 CURTISS SBC-3 CURTISS SBC-4 DOUGLAS TBD-1
U.S.S. RANGER	WILLOW GREEN	VOUGHT SB2U-1 VOUGHT SB2U-2 VOUGHT SBU-1 VOUGHT SU-2 GRUMMAN F3F-1 GRUMMAN F3F-3 CURTISS SBC-3
U.S.S. WASP	BLACK	GREAT LAKES BG-1 GRUMMAN F2F-1 GRUMMAN F3F-1 GRUMMAN (UTILITY) JF-1 VOUGHT SBU-1 VOUGHT SB2U-1 VOUGHT SB2U-2



When Color Schemes were GAY!

By CHARLES R. WOOD

Most elaborately painted airplanes in world were the Navy's in years between 1918-1940. Method in the madness.

Broad red chevron on wing of this Boeing F4B-4 helped the wingmen to line up with flight leader. Tail colors for base carrier.

► The time, a year or so before World War II. The place, the fantail of the aircraft carrier U.S.S. Enterprise, the soon-to-be-famous "Big E."

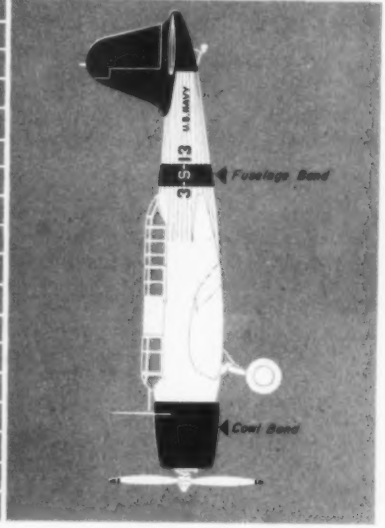
Over the shimmering water of the Pacific a stubby biplane fighter, a Grumman F3F-3, turns toward the flight deck of the carrier. The fighter's wings flash as the sun reflects off of the vivid yellow-orange upper wing and the

Hawk SF11C-3 on acceptance trial, all silver, orange-yellow top surface of upper wing. Against sky or water, visible for miles.

Three Devastators, Sqd. 5, Yorktown (red tails). Leader, solid blue cowl, wing men half painted cowls, one top and one bottom.

TABLE 2- FLIGHT COLORS

NUMBER OF PLANE	FUSELAGE BAND	ENGINE COWL TOP HALF	ENGINE COWL LOWER HALF	MARKINGS
1- SQDN. COMMANDER	RED	RED	RED	
2-	———	RED	———	
3-	———	———	RED	
4- FLIGHT LEADER	WHITE	WHITE	WHITE	
5-	———	WHITE	———	
6-	———	———	WHITE	
7- FLIGHT LEADER	BLUE	BLUE	BLUE	
8-	———	BLUE	———	
9-	———	———	BLUE	
10- FLIGHT LEADER	BLACK	BLACK	BLACK	
11-	———	BLACK	———	
12-	———	———	BLACK	
13- FLIGHT LEADER	GREEN	GREEN	GREEN	
14-	———	GREEN	———	
15-	———	———	GREEN	
16- FLIGHT LEADER	YELLOW	YELLOW	YELLOW	
17-	———	YELLOW	———	
18-	———	———	YELLOW	



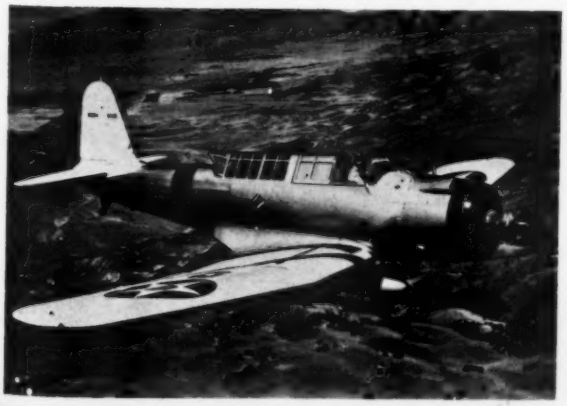
shiny silver lower wing. Rolling out of its turn and rapidly approaching head-on the Grumman looks like a red nosed silver bumble bee, the dangling arresting hook poised like a stinger.

We duck instinctively as silver wings pass overhead. A spraddle legged landing gear extends below the portly fuselage, and now there is a glimpse of bright blue tail surfaces. Flying wires moaning, the fighter thumps to the deck with a scrunch of tires and a protesting "twang" of the arresting cable as it engages the hook.

The plane handlers grab the lower wing hand-holds as the hook disengages and the plane taxies quickly forward to make room for following flights of the squadron. Now that the Grumman is farther forward we can see a red band circling the fuselage in addition to the red nose cowling. For the first time the large red, white and blue stars painted on the upper wing tips are clearly visible. There are also two broad red stripes flanking the plane number on the upper wings' center section that converge to a V at the leading edge.

As the fighter reaches its assigned place on the flight deck, we notice that every plane secured there, including the Scout and Torpedo bombers, has a bright blue tail assembly. These bright blue tails were the Enterprise's aircraft tail identification color. Other carriers were also assigned tail identification colors as shown in Table 1.

Letterings and markings, as on Vought SB2U shown, were black except when tail colors, band, were dark. Lettering then in white.



This coloring of the tail assembly, peculiar to aircraft of the U.S. Navy, helped to make them the most elaborately painted bright silver with a yellow-orange top-wing surface a definite system and, although complex, made the airplanes easy to identify either against the sky or, if the necessity arose, against the water.

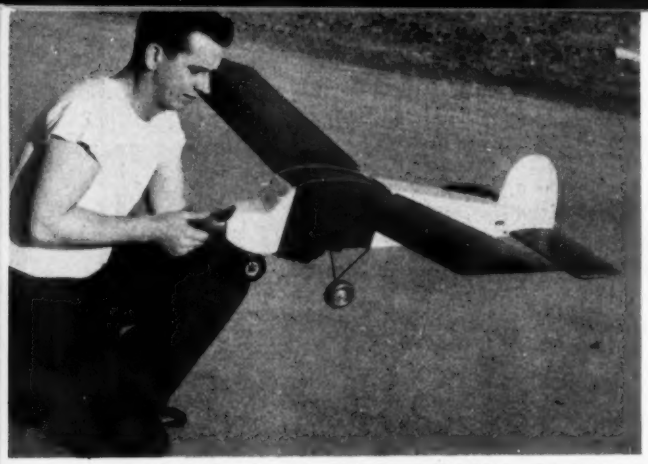
Generally, all U.S. Navy Carrier planes in 1940 were painted bright silver with a yellow-orange top-wing surface and the tail colors of the base carrier. The yellow orange orange top-wing surface presented a brilliant splash of color against any background. In the case of an airplane forced down, it could be seen for miles. A Grumman F3F-1 is shown in manufacturer's delivery colors before carrier, squadron and flight colors were added. The dividing line between the silver underside and the yellow-orange top side of the upper wing shows very clearly.

The broad red chevron, V, on the top surface of the wing, as shown in the photo of the Boeing F4B-4 was a visual aid to assist formation flying in three-plane flights. A carrier squadron consisted of 18 planes divided into six three-plane flights. Each flight leader had two wingmen who took positions above and behind his plane, generally in line with the angles of the flight leader's chevron. On low wing monoplanes, because of the fuselage, the chevron could not be brought to a V so the stripes were started just outboard of the wing (*Continued on page* 52)

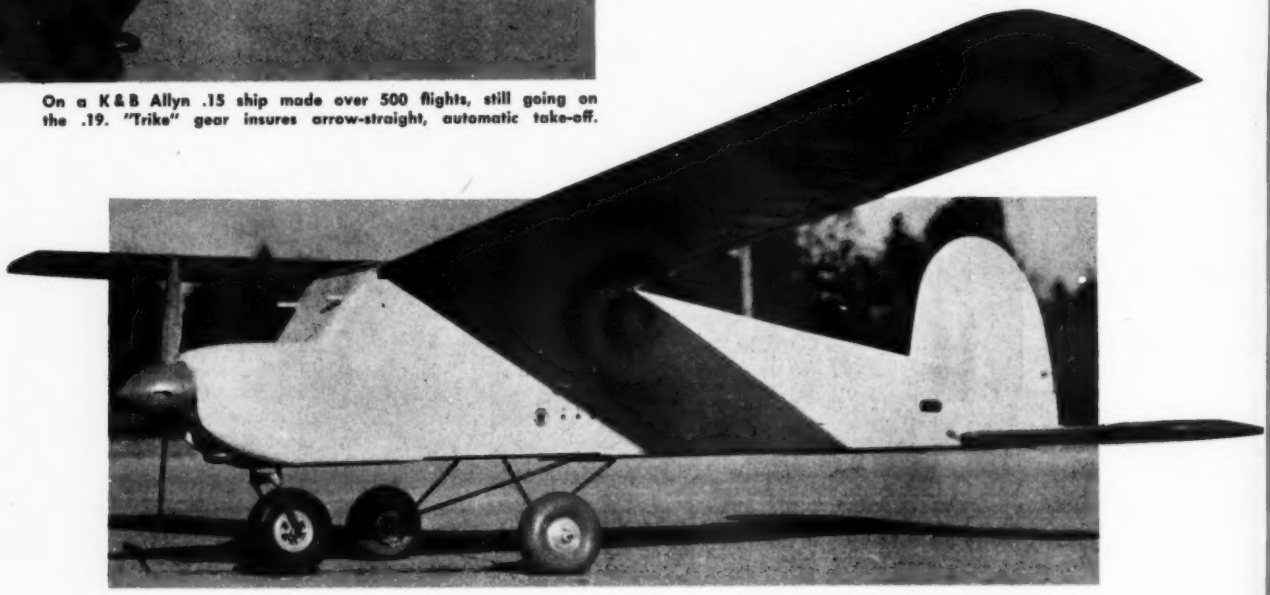
Grumman F3F-1 in manufacturer's delivery colors, similar to Hawk, opposite page. Carrier, squadron, flight markings put on later.

by ROBERT DREWS

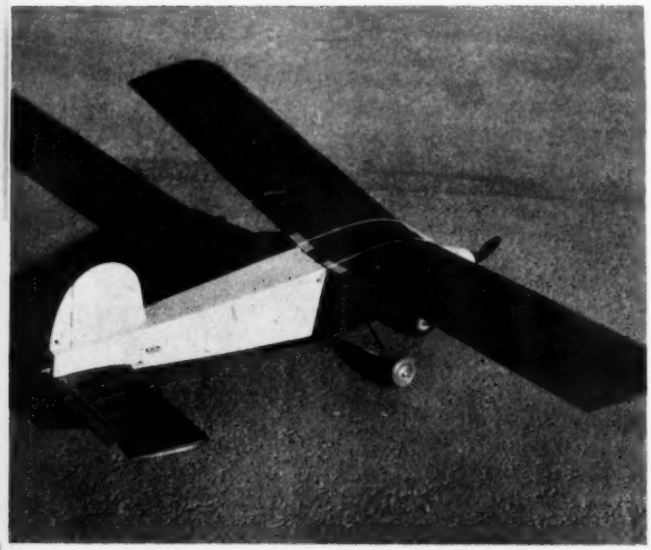
The Victor



On a K&B Allyn .15 ship made over 500 flights, still going on the .19. "Trike" gear insures arrow-straight, automatic take-off.



Over 700 flights without trouble on Citizenship 465 prove this functional, sturdy airplane a hot prospect for beginners—all rudder-only competition.

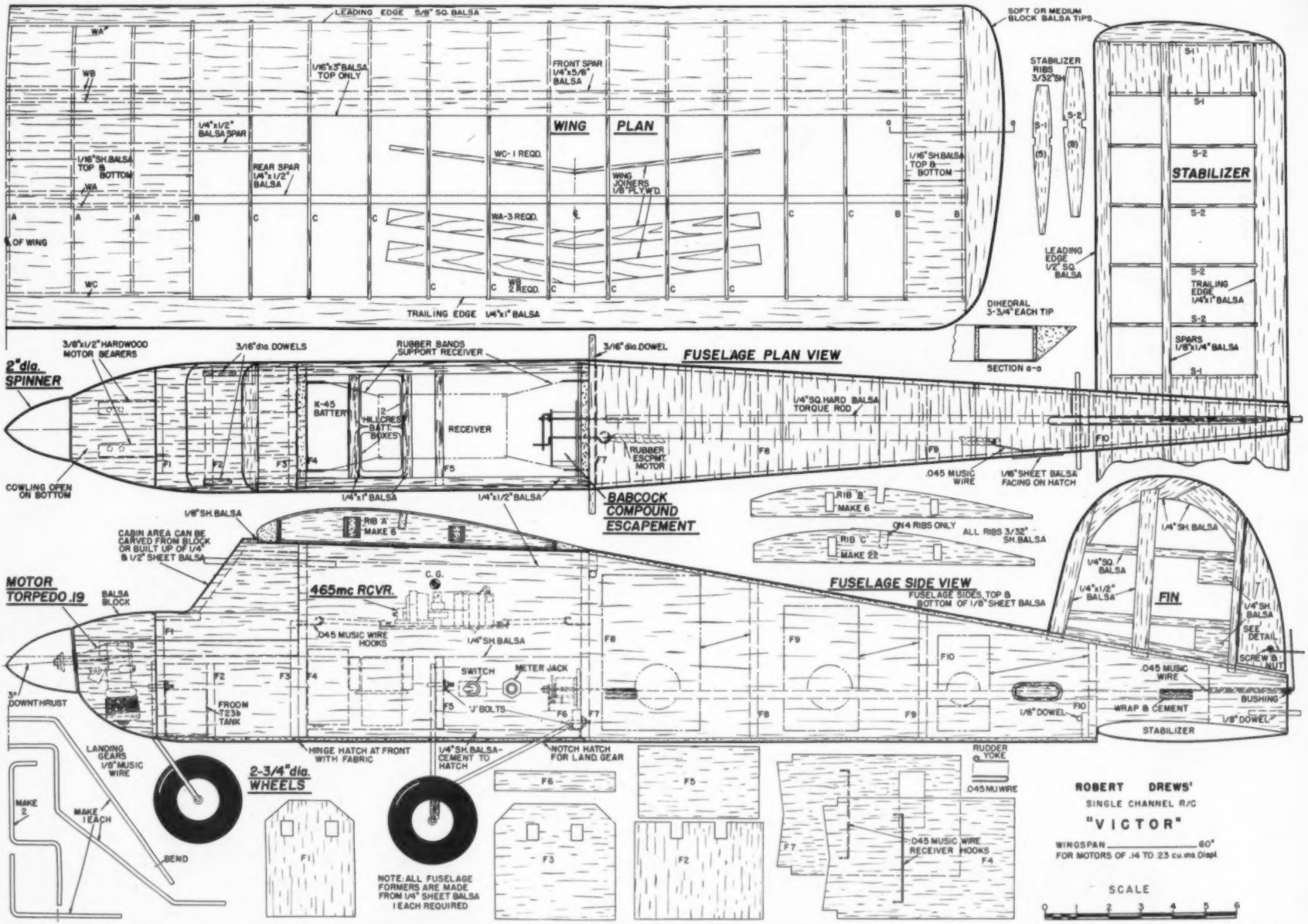


"Torsion bar" design of nose gear gives shock absorbing quality, yet stands the gaff of one-wheel landings. Simplest construction.

► In flying rudder-only, a contestant wants a model that will take off smoothly and realistically (a tricycle gear makes this automatic), with none of the zooming effect found in most commercial models. After it loses contact with the ground, the model must then be able to fly straight for good wind penetration. The turns must be definite upon signal and not varied due to entering the turn from different wind directions. Upon completion of flight pattern, the ship must then be capable of trying for extra points, such as spiral dives, loops, wingovers, etc.

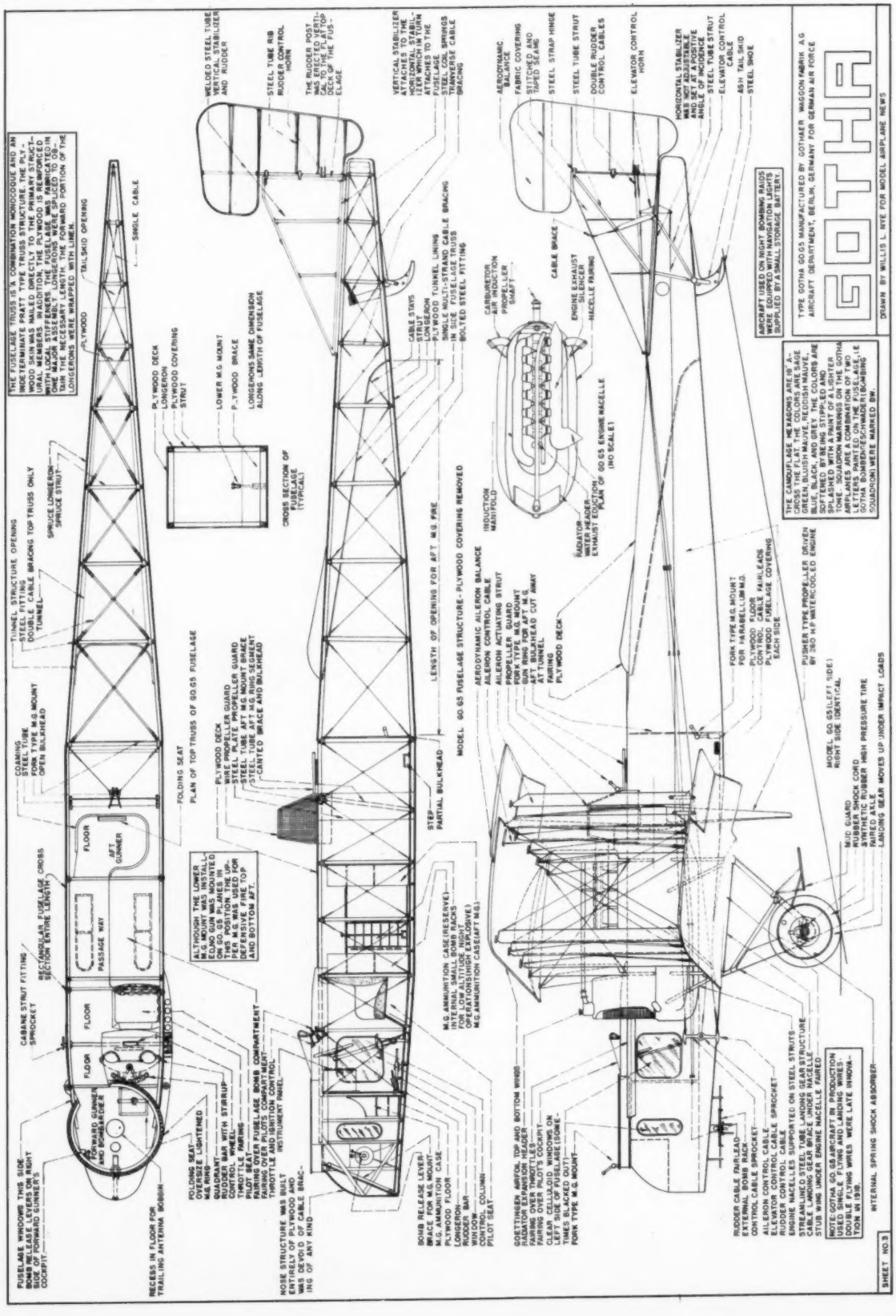
In the glide flight, the ship's descent must be smooth and definite on calm or windy days in order to reach the spot landing area with any amount of success. Upon landing, the model (if a three-wheeler) should make contact with the ground, first with its main gear, to produce a smooth roll after initial contact for perfection landing points, not a series of bounces because of the nose wheel's making contact first. And the ship must be capable of withstanding that one flight when the escapement locks and the ship spins in, or that one time it strikes a nearby car or tree. The Victor meets these requirements.

The first 500 flights were made with a K&B .15 motor, sufficient for average sport flying. For serious contest flying, a K&B .19, with a 9 x 5 Tornado prop, was installed. After 200 more flights this (*Continued on page* 41)

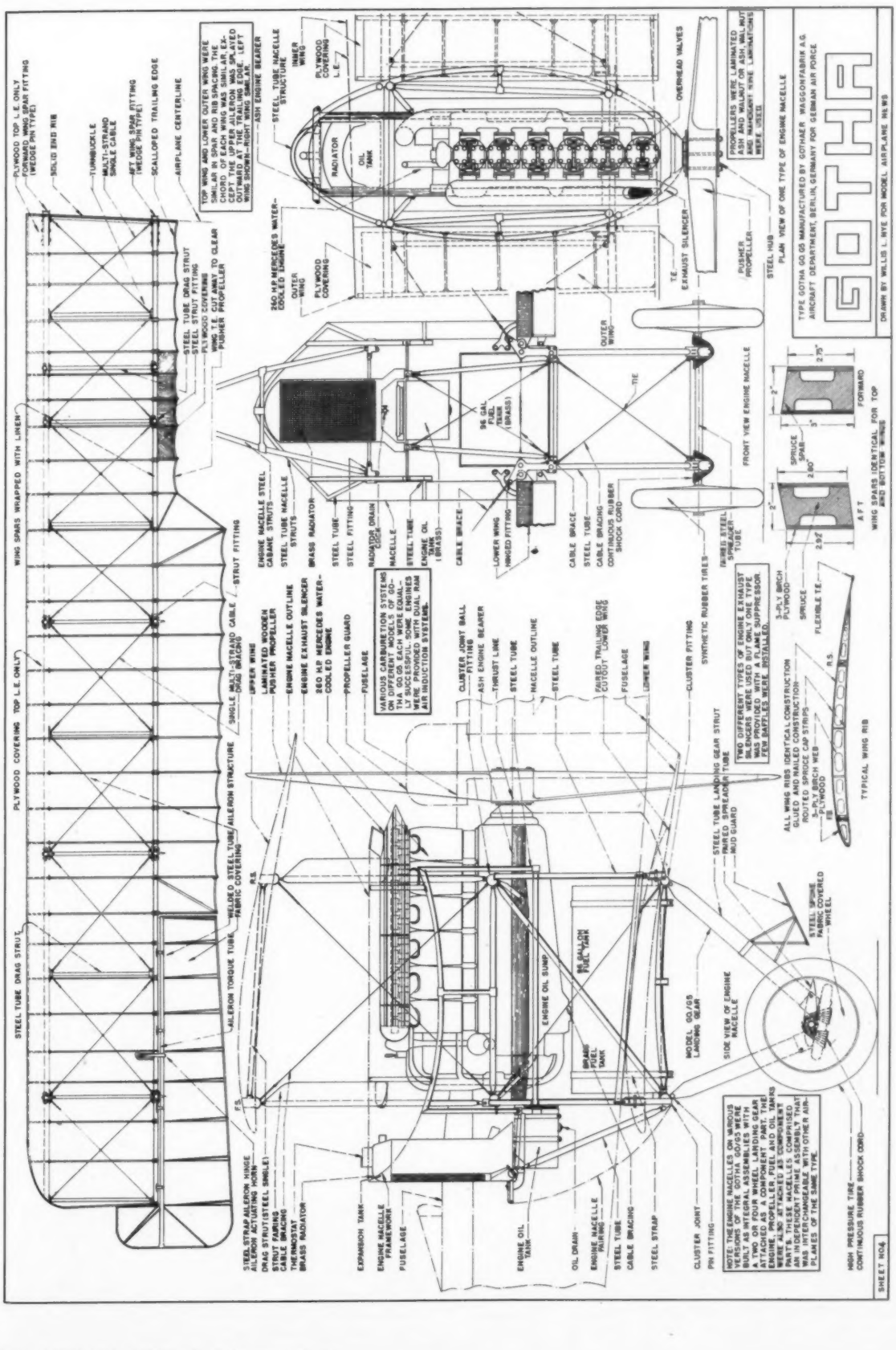


FULL SIZE PLANS AVAILABLE. SEE PAGE 56.

THE GOTHA GO. 5. These two plates conclude the presentation of the German WW 1 bomber.



After the flop of the Zeppelins, Gotha formations hit London. Day, then night, kaput!



camera in the sky . . .

Harrison Morgan installed an RC camera in a modified Gramps for aerial photos.

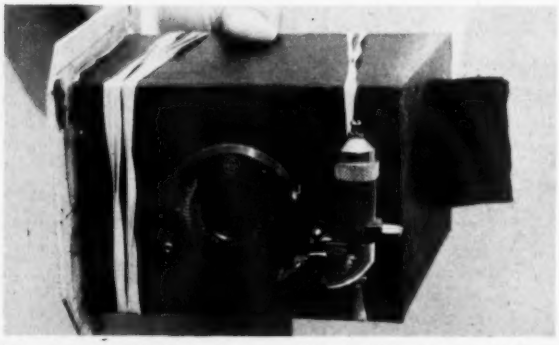
Photograph from 700 ft., made at New England, Radio Controlled Championship Meet. Note Piper Cub, lower left. Some pix were made from greater altitudes but people could not be seen.

Daughter Margo holds the 8¾ lb. Gramps, MAN plans. Span enlarged, power a K & B Allyn .19.

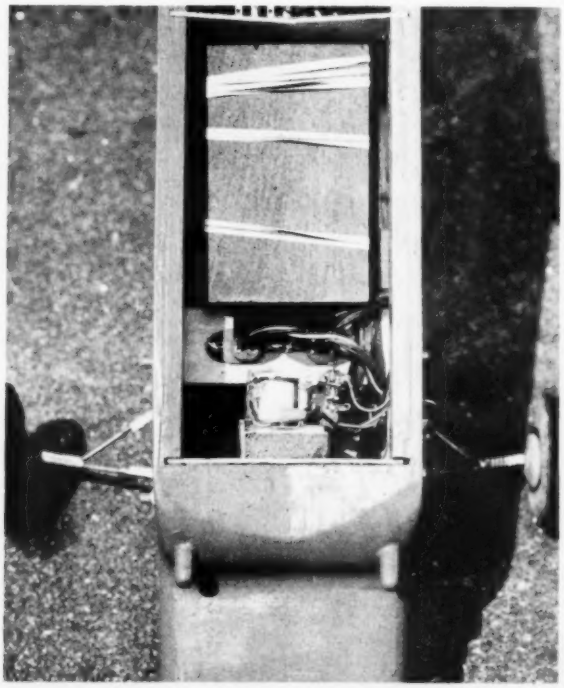
Pix from low altitudes need faster shutter than 1/300 used. 83mm Voightlander Skopar f4.5 lens.

Under view of plane shows camera shoots through hole in bottom. Knock-off landing gear.

Harrison Jr. and dad built two separate r'cvrs and x-mitters. A slide mount permits easy installation and removal of the camera.



Camera made of balsa, nylon covered for lightness. Compur shutter, King Sol tripper. Back of camera built to accept 2¼ x 3¼ pack.



Looking down on Gramps: Vari Comp escapement top, camera, Lorenz r'cvr, Sigma relay. Pix, courtesy Fairchild Camera & Instrument.

RADIO CONTROL NEWS

by EDWARD J. LORENZ

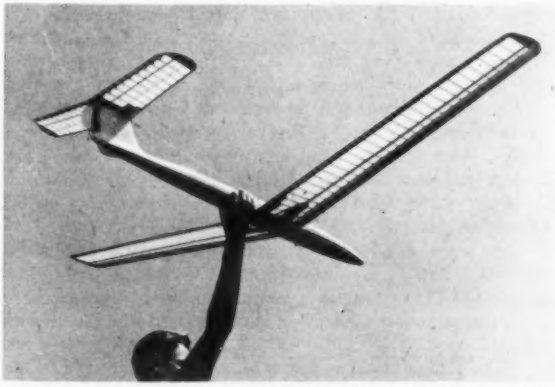
Readying his big .59-powered team racer for take-off, Bob Coon touches up the needle valve. Despite short wings, weight, it goooes.

Printed circuits, miniaturization, multiple and simultaneous channels, low drain, reliability—our industry is doing the job!

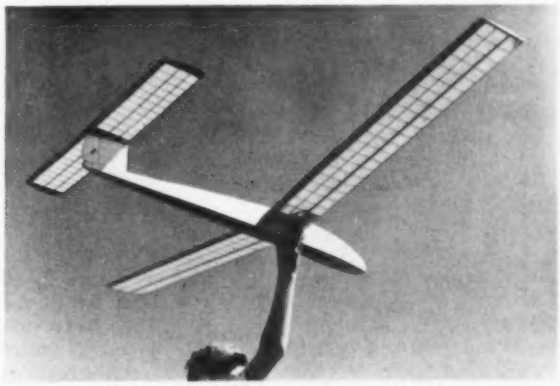
TECHNICAL TOPICS

► Be sure to check your batteries, both in the receiver and transmitter, when flying on cold days. The dry battery type is especially critical of temperature, and a wet cell must be kept fully charged in order to deliver anywhere near the rated power. The silver-zinc type battery, or cell, will give good service for filaments or actuators even at low temperatures. These cells are rather expensive, as compared to flashlight batteries and, therefore, should be given the proper care. Here are a few hints on the care of Silvercel batteries: *don't* use dirty or contaminated filling tools which have previously been used on lead-acid batteries; *don't* add distilled water regularly, it is not required; *don't* attempt to check the specific gravity, such as with a lead-acid cell—it will not indicate the state of charge. Do read the manufacturer's instructions and follow them when adding water, charging or maintaining the cells; do check the cells for electrolyte leakage. If this is found, it could mean that the cell has been overcharged, discharged at too high a rate or the electrolyte level is too high. As has been mentioned before, the power you use for filaments and B supply is the heart of your RC system. Therefore, check your batteries and cells periodically under load, see that connections are tight, that the cells or batteries cannot vibrate or bounce around and use a cell

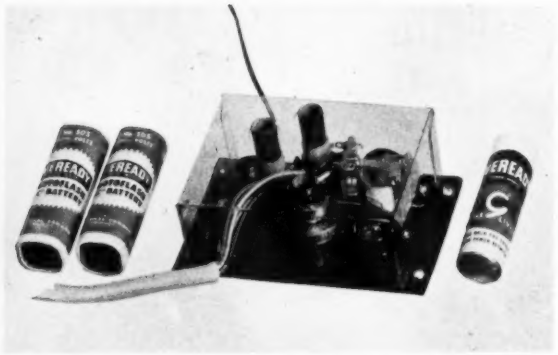
(*Continued on next two pages*)



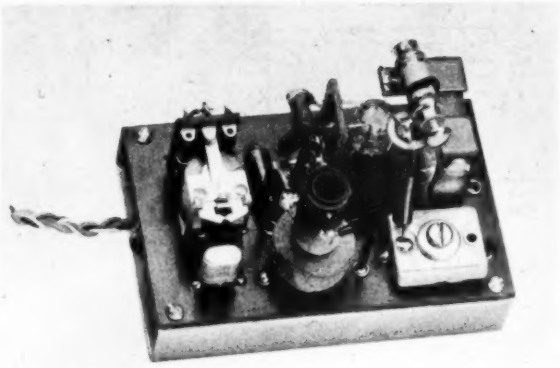
A 72-in. quickie glider design, Helmut Bruss, Bad Pyrmont, Germany, 30 ozs., Miniking receiver, a Telematic Alpha actuator.



More streamlined glider, Hans-Joachim Siedschleg, features a removable fuselage top for access to the single-channel receiver.



Miniaturized, printed-circuit r'cvr—also a kit—by Citizen-Ship. Such receivers make the .09 plane kit really light, practical for beginners.



And the companion Citizen-Ship r'cvr for 465. Improved relay action and sensitivity. It supercedes r'cvr in Victor, plans in this issue.

size that will deliver the required amount of current.

• • •

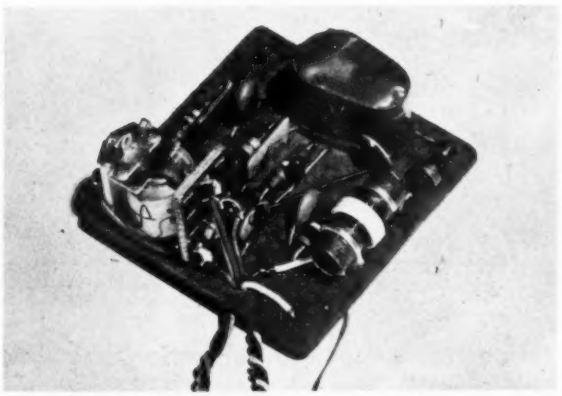
The transistorized detector circuits, which have appeared in this column, have been checked recently and have been found to be suitable for the majority of RC work. This does not mean they necessarily can be used as is, but they are a starting point for the experimenter. Fig. 1 shows a circuit which we put together and which more closely follows the circuitry and layout of tube circuits. This circuit may be modified in much the same manner as tube detector circuits. All of the circuits pulled in "hams" and other signals between 20 and 35mc, using but a one-foot antenna on a bench rig in our basement.

• • •

Following is a description of our timing device for speed runs. Fig. 2 shows the principal parts. Two tracking heads are needed for each system. The frame may be made of hardwood, aluminum or iron channel. All rotating or movable pieces must be made with little or no play, in order to obtain maximum accuracy. The Lucite stock can be obtained from local plastic working shops. No precise details will be given on the mechanical parts since it would not be practical or feasible for some builders to duplicate our exact set-up. Bearings can be obtained from stores selling workshop equipment. The vertical plastic pieces, having the sighting line scribed on them, must be squared with the base and each other. The disc, which rotates with the sighting bar, is made from plywood or ¼" micarta. Swiveling of the sighting bar in a horizontal plane is accomplished by fitting a pipe flange to the underside of the disc, a ½" or ⅝" shaft, 6" to 8" long, first being welded into the flange. Be sure this shaft is square with the base of the flange. Two bearings, ball bearings or oilite bearings, are fastened to a base for support of the shaft. This base can be made to set on a table or built into the top of a tripod. For greatest accuracy, a small spirit level may be mounted on the sighting bar to facilitate set-up of the timing stations. The sketches are self explanatory and next month we will detail the building of the electrical and electronic section of this time. Take your time in building the mechanical parts and 75% of your worries are over. Sand all wooden parts and apply several coats of varnish.

• • •

When will someone come up with a new idea for an actuator? The Graupner Telematic actuator which was mentioned several months ago in this column has a radically different type of action. This 2½-ounce unit utilizes a vibrating system to turn a clutch type mechanism. Operation is from a six volt source, but the current drain is only 55ma (on the unit we (*Continued on page* 54)



Arista-craft r'cvr measures 2 in. square. Can use various subminiature hard tubes and has good current change, a single tuner.

COON'S TEAM RACER

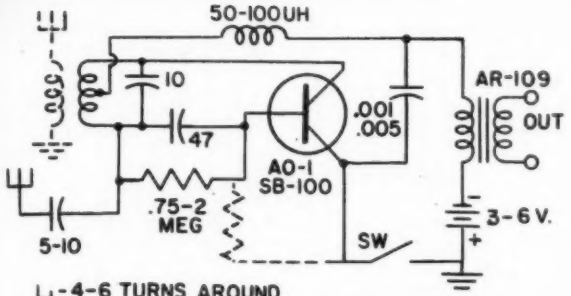
► Idea for a large RC team racer, dates from '54. Since a 6-channel English receiver was then available, Bob used one channel for a switcher to transfer rudder control to aileron control and back when desired. A printed circuit made contact with five-contact rotor to transfer servo "go" and "return" circuits.

The low dihedral, short wings, and other points were so off-trail from standard practice, dire results were predicted. Glide testing was out of the question, so power was gradually increased on taxi runs for take-off. Early flights with the 750 sq. inch wing at 24½ oz. per sq. foot wing loading were on the hot side. Once, up-elevator in a turn caused an unexpected snap-roll, at low altitude—Bob increased wing area to 900 sq. inches, wing loading 20⅝ ozs. An enjoyable 50 flights were made.

The model would stay in a turn at least ½ to ¾ of a full circle before rolling out, flew smoothly in turns, inverted flights, landings, etc. Landings were slow and nose high. The model took off with .49 installed, but on gusty days wobbled after take-off. Fox .59 provides fast, smooth take-offs.

Bob set the ailerons for minimum travel, and got a moderate bank. Then simultaneous 8-channel equipment appeared. This provides a more simplified aileron control than the switcher system and allows a trimmable throttle too.

Early flights were made without the wheel pants and nose cowl because the Sepulveda basin has only a short asphalt area.



L_1 - 4-6 TURNS AROUND L_2

L_2 - 12T NO. 24 EN. WIRE ON 3/8" DIA. SLUG TUNED COIL FORM.

COMPONENTS IN DOTTED LINES ARE EXPERIMENTALLY OPTIONAL. DO NOT USE COMPONENT IN BOTH POSITIONS.

Fig.1

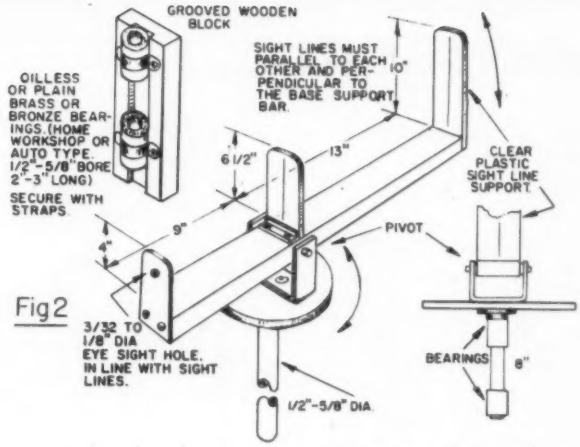


Fig 2

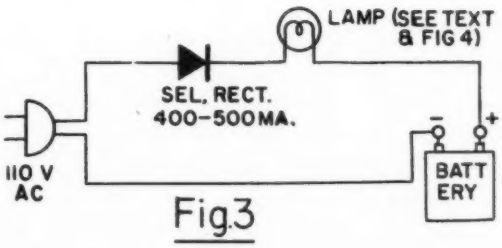


Fig.3

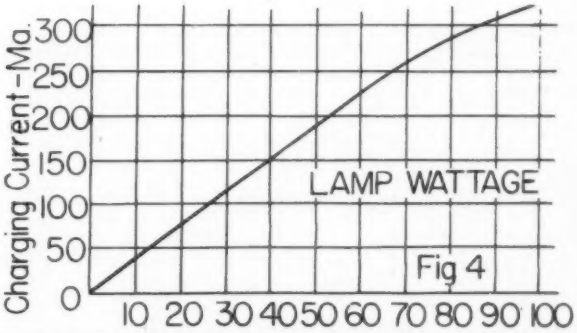
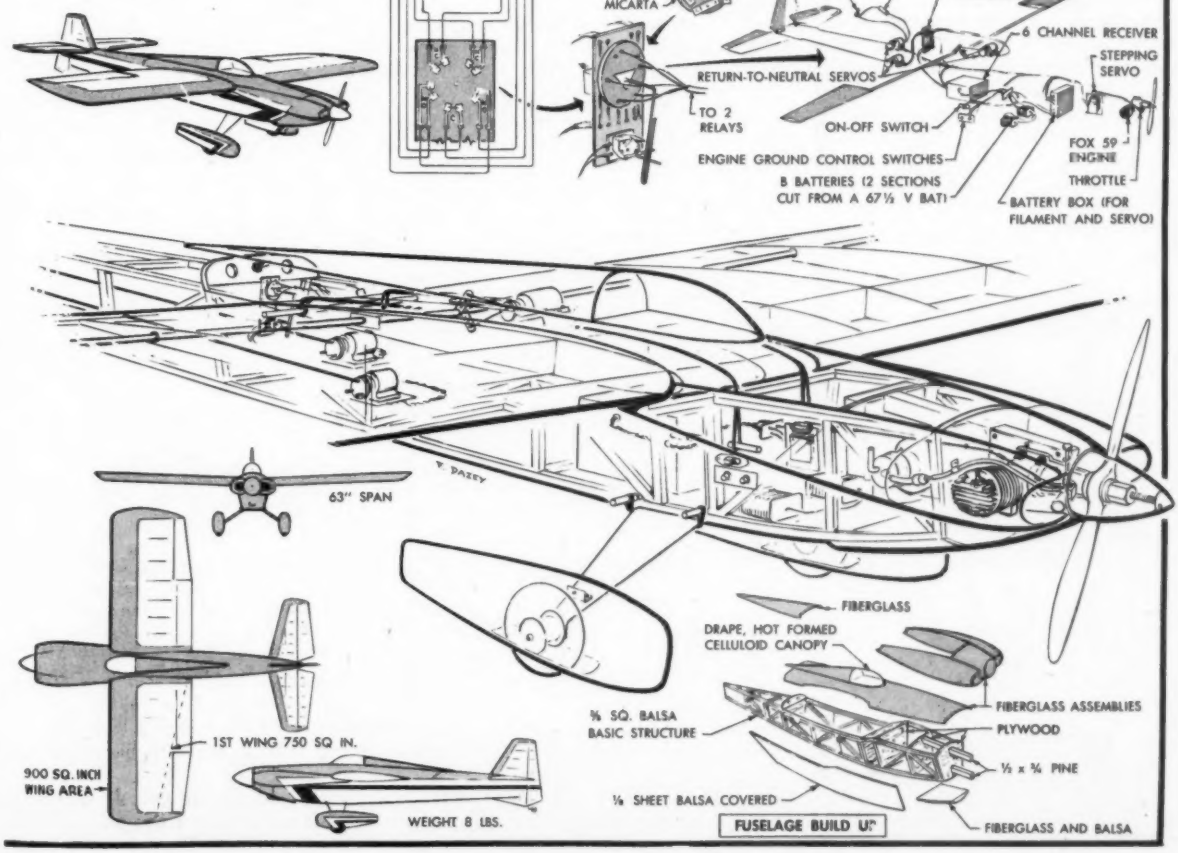


Fig 4

DETAILS

ON "FANG", BOB COON'S 6 CHANNEL TEAM RACER



P. G. F. CHINN

FOREIGN NOTES

A monthly world-wide round-up of technical developments, designs, significant industrial products.

Some time ago we suggested that the annual King of the Belgians Cup international radio-control contest ought to be given world championship status. This contest produces very high standards of flying from Germany, Belgium and France and, we believe, needs only American participation to give it number one interest rating over all other events in the world of international modeling. Now, in its leading editorial, a British magazine has come up with the same idea and the time may not be far off when the FAI decides to put the event alongside Wakefield rubber, Nordic A2 glider, FAI gas and FAI speed as an official World Championship contest.

BELGIUM

The King of the Belgians Cup contest for multi-channel RC, the closing event on the 1957 FAI calendar, was again held at Antwerp and attracted a record entry from eight countries including the U.S.S.R.—the first time the Russians have competed in a radio event outside the Soviet Union.

The contest was once again dominated by a duel between Stegmaier of West Germany and Gobeaux of Belgium. This time, Stegmaier turned the tables on his rival (last year's winner) and regained the premier award. The German champion used his now familiar streamlined, tricycle-geared, strut-braced shoulder-wing model, powered by a German Ruppert twin-cylinder Diesel with integral pump for the vacuum servo 8-channel control system. Gobeaux had his new 1957 model, an angular, box-fuselage, tip-dihedralled design, now also fitted with a Ruppert Twin. He was using Orbit 8-channel equipment on rudder, elevator and ailerons. Both fliers gave first-class displays comparable with the best U.S. standards.

Making a notable comeback in international RC in third place was Wastable of France. His all-own-design effort featured a new version of his AW-6 cabin model with an unusual 7-channel control system on rudder, engine, elevator (proportional, plus self-centering control) coupled flaps and ailerons. In fourth spot, Bernhardt flew his elegant low wing semi-scale Ruppert Twin powered ship mentioned in our November column. Bernhardt, (who is now in partnership with Stegmaier in the manufacture of RC gear) was, of course, using Stegmaier 8-channel equipment and had rudder, motor, elevator and ailerons.

Among the remaining countries represented in multi-channel, Britain was poorly placed (due, in some measure, to three of the entries having to be modified to conform with the rules) but the Russians, Gorynin and Malik, did quite well by finishing mid-way down the list. Malik had the biggest model at the meet—about 11-ft. span.

The main event, as usual, had two supporting contests: for single-channel and single-channel towline-glider. The first was again won by Bickel of Switzerland using the remarkable delta-wing pusher featured in our three-view drawing, p. 28, July '57 M.A.N. The glider event was also won by Switzerland.

RUSSIA

By virtue of their team win in the 1956 contest held in Yugoslavia, the Russians became hosts for the 4th Criterium of Europe free-flight gas event, and this was held at the Tushino airfield near Moscow. Besides the Russians themselves, teams attended from five countries in the Soviet sphere: Bulgaria, Czechoslovakia, Hungary, Poland and Rumania, plus Finland and Yugoslavia. Attending as an observer and guest of the Central Aero Club of the U.S.S.R., was Britain's Alec Houlberg, chairman of the FAI Models Commission.

The contest itself (preceded by much ceremony) was well organized, but a high wind caused many flyaways with which the helicopter-directed recovery service could not always cope. Our Czechoslovakian correspondent, free-flight champion Rudolf Cerny, for example, lost both his models during the contest. The winner was Moldavian of Rumania, who was the only contestant with a perfect five-flight score of 15 minutes.

Models, of course, were to the official FAI formula and mostly followed the normal pylon layout. Moldavian's had twin end-plate type fins on the stabilizer and used the East German Zeiss Aktivist motor. In second place was Abramov of the U.S.S.R., with 14:40, using a Russian Petukov-designed motor and third was Jiri Cerny of Czechoslovakia who used an American Torpedo-15 and a West German Webra Mach-1.

The highest placed nation on a team basis was Finland who, despite having only nine maximums against Czechoslovakia's 14, just beat the Czech team total with 25 seconds to spare. Third was the U.S.S.R., followed by Yugoslavia. The Finns were using Western motors, including Oliver-Tiger, E.D. 2.46 and Webra Mach-1. The Czech motors included two prototype MVVS 2.5 c.c. Diesels (especially developed for the 1958 World Free-flight Championships to be held in England) and four AMA Diesels in addition to the Torp and Mach-1 already mentioned.

Not the least interesting feature of this meet were the lavish prizes given to the first, second and third place individual winners. These were a Soviet "K-125" motor-cycle, a TV receiver and a "Kijev" 35 mm. precision camera.

FRANCE

Albert Wastable, whom we have mentioned earlier as taking third place in the King of the Belgians Cup contest, won the multi-channel event at the French Championships. This is an "invitation" meet, modelers being required to qualify via district eliminators held in various parts of the country, and, in addition to radio (single, multi and glider) there were the usual FAI classes for rubber, gas and towliner, plus three classes of speed (.15, .30 and .60). Current French "name" in speed is Jarry-Desloges, who builds his own motors, distinguishable by their long shafts and the sleek high aspect-ratio models which house (*Continued on page* 38)

Fast Miler

(*Continued from page* 10)

of ¾x2x22½" bass wood and outline the crutch to the shape given on the plans. Saw the outside outline of the crutch and smooth out the saw cuts with a rough grade of sandpaper wrapped around a hardwood block. Next saw out the inside of the crutch including the 1½" diameter circle for the engine location. Notice that the Fox 29R has a 3/32" cylinder head offset. Next, carve the integral tee section for the landing gear support, and carve the nose section for engine clearance. Now, fit the engine and the pan to the crutch and locate the pan tie-down holes. Drill and tap #6-32 holes in the half pan. Use #6-32 flat head screws with a slot-head recess for pan tie-down.

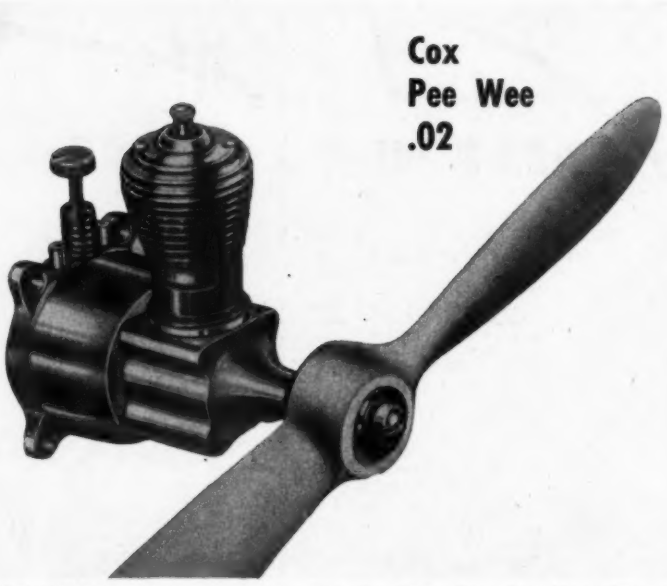
Form the landing gear from ⅛" steel music wire. Wrap a piece of tin, obtained from a tin can, around the mounting end of the landing gear. Drill holes for #6-32 mounting screws through the sheet metal mount at the location indicated on the plans. From these holes, locate and drill the mounting holes on integral "tee" on the fuselage crutch. Now, remove the landing gear for shaping the top and bottom fuselage blocks.

Outline the fuselage plan form, using the crutch as a guide on a 2x2x22½" hard balsa block for the bottom half of the fuselage. Saw out around the outline including the 1½" diameter circle for the engine location. Carve out the engine cooling inlet and engine cooling exhaust holes. Sand and give the inside of these cooling inlets several coats of fuel-proof dope before continuing. Next, cement a sheet of ¼x2x5½" basswood for cowling top on fuselage bottom half. Carve the fuselage bottom half to shape as indicated on the plans using the cross-sections shown as a guide. Tack-cement the fuselage bottom half to the crutch and rough sand to shape. Remove the fuselage bottom half from the crutch and hollow out to the same thickness as on the crutch. Next, locate the ⅛" diameter access holes on the bottom half of fuselage in line with the pan tie-down screws. Drill the ⅛" diameter hole completely through the fuselage bottom half. Counterbore the 5/16" diameter hole for tie-down screw clearance to ½" depth. Be careful while drilling these holes because they have very close edge distance and the fuselage bottom half could easily be ruined at this time.

Outline the plan form of the fuselage on a 1x1¾x16½" piece of hard balsa block for the top part of the fuselage. Use the aft portion of the fuselage crutch as a guide. Mount the half pan in place on the crutch and tack cement top fuselage half to the crutch. Then carve and rough sand to shape. Remove this piece and hollow out to the same thickness as in on the crutch. Leave ample room at the rear end grade balsa for carving the wing. Outline for clearance of the elevator horn.

WING: Use a sheet of 3/32x6x36" hard grade balsa for carving the wing. Outline the wing plan form on the balsa sheet. Saw out around the outline and rough sand the edges. Since a symmetrical airfoil is used, a line can be drawn equidistant between the edges and all the way around the wing leading edge and trailing edge for the location of the chord plane. Next, draw a line full span on the top and bottom of the wing to locate the maximum thickness of the wing. These lines are used

(*Continued on page* 34)



Hold any of the .049 Cox engines at arm length and you'll realize how small the .02 really is.

Yet, for all its charm bracelet qualities, performance is sensational. Spin the prop and see!

Engine Review

For Half A scale and free flight sport, tiny .02 is a life saver, could begin a new trend.

by E. C. MARTIN

► This new piece of magic from Thimbledrome is pure wizardry both to look at and operate. Its appearance is so similar to the larger Cox engines that for a moment you do not realize that you are not holding it at arm's length!

First thing we did was grip firmly between thumb and forefinger and fire it up while reclining in the armchair beside the family hearth. Of course, the palsy of the hand has cleared up now, but we still throw our hat in first when entering the house. Unfortunately, we have no range of test props to cover an .020 and no precedent for comparison but, if an impression is anything to go by, this little bundle has amazing power. Remarkably, starting and needle adjustment are on a par with the best, regardless of size.

There are no castings in the basic structure of this engine and, with the exception of the fuel tank backplate, which is a die casting, the entire job is machined from bar stock. The crankcase is turned from a dural type material which began either as an extrusion or was form milled in bar lengths before turning. After rough turning, the work is tumbled to a uniform finish and then receives its final machining operations to produce a really featherweight component of unusual strength. The 5/32 diameter crankshaft runs in a well fitting unbushed bearing and the middle third of its length is relieved. The counterbalanced crankpin is a mere 5/64 diameter and receives a sturdy little steel conrod whose ball end is swaged into the piston. The cylinder is a scale model of the larger Thimbledrome variety having twin opposed exhaust ports, bypass grooves, and integral fins. The top is tapped to receive the aluminum plug head combination, and the lower end is threaded to screw into the crankcase.

In very small engines, of about half inch bore and below, a hardened steel piston and cylinder maintain their shape and fit for very long periods and are easier in some ways to finish to the extreme accuracy necessary for reasonable compression sealing. Larger bores are prone to seizure when both components are glass hard, and a soft- or cast-iron piston in a hard cylinder seems to yield greater and more consistent performance. When both surfaces are hard and the cold clearance between piston skirt and cylinder wall is only a fortieth part of one thousandth of an inch, it will be evident that the most minute errors can cause performance variations among apparently similar engines that often never disappear with running before the rest of the engine is worn out. In these days of highly competitive enginesmiths a radical difference between the best and worst of a design is too great a risk, and consequently the hardening of both components is uncommon in America.

The basis of the trouble is that the very principle of the lapped piston and cylinder is a marginal proposition. It happens to just about work, like the full-sized poppet exhaust valve, but now it is taken for granted and roundly cursed when it won't play. Kept at a constant temperature the clearances will remain constant and as manufactured. Heat the piston and the clearance will diminish. Less clearance causes friction. Friction causes heat. Cylinder heat radiates from cooling fins, piston heat does not, so the clearance becomes less and less until it disappears and the

(*Continued on page* 43)

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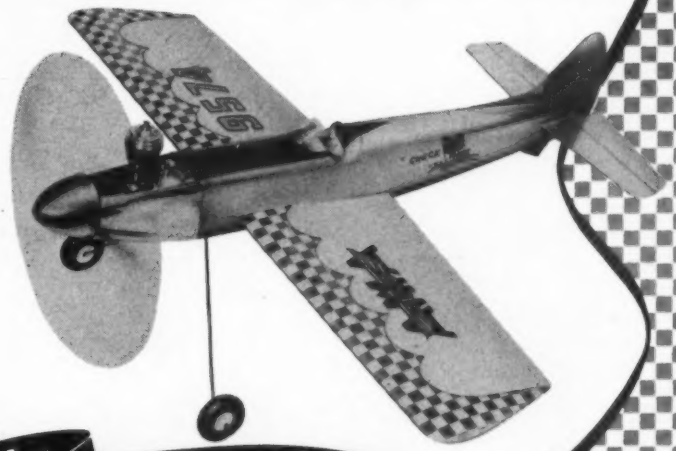

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BASIC ENGINE SPECIFICATIONS

Bore	0.732"
Stroke	0.712"
Displacement	0.290 cu. in.
Weight	7.0 ounces
H. P. Rating	0.54 at 12,500

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Fast Miler

(*Continued from page 29*)

as guides in carving the airfoil to shape. Next, make a cutout for the ¾x¾x6" basswood stub spar and locate it on the wing as indicated on the plans. Cut out the stub spar and cement.

Locate the centerline of the Monoline unit and install according to the instructions that come with the Monoline control unit. Remove the unit and carve the airfoil to shape using at least a 3" blade pocket knife or x-acto carving blade. Use a rough grade of sandpaper wrapped around a hardwood block to sand the airfoil to shape. Remount the control unit with #2-56 round head screws. Cover the entire wing with silk and give it several coats of nitrate dope. Note that if the finishing instructions in this article are to be followed, it is necessary to use nitrate-base dope on the wing because the Lavex primer will not paint over acetate dope successfully. Cut the 3/64" diameter music wire pushrod to the approximate length needed. Make a right-angle bend and insert it into the bellcrank with the bent end pointing downward. Now, insert the bellcrank on the mounting bracket and solder the pivot pin in place. Caution: Do not trim the length of this pin. The extra length is needed for grip to make a secure solder joint.

STABILIZER and RUDDER: Outline the stabilizer on a ¾x3x14" basswood plywood or maple sheet and saw to shape. Do not substitute balsawood because vibration from the engine will break it in half. Sand the edges with a rough grade of sandpaper. Carve the symmetrical airfoil to shape and rough sand. Saw out the elevator and sand the edges to a round shape on the elevator hinge line. Next, form the elevator horn out of 3/64" steel wire using heat from a kitchen stove to make the bends as indicated on the plans. Outline the elevator horn mounting end on the elevator at the proper location as shown on the plans, and make a grooved recess in the elevator using this outline. Drill small 1/32" diameter holes around the outline of the horn in the elevator. Now, place the horn in the recess and sew in place using an abundance of cement to hold the horn securely. Wrap a piece of linen cloth around the elevator at the horn location and cement firmly into place. Install the hinges made of linen cloth, preferably aircraft linen purchased from the hobby shop. Apply extra coats of cement over hinges to assure firm contact.

Outline the rudder on a ⅛x3x7" basswood sheet. Plywood or maple may be substituted. Saw out the rudder and sand the edges. Carve the rudder to a symmetrical airfoil shape and sand.

FINAL ASSEMBLY: Cut the pushrod to the proper length and make a small length right angle bend to fit the elevator horn. The bend for the elevator horn need only be long enough to fit loosely between the sides of the fuselage top half.

Make proper cutouts for the wing and the horizontal stabilizer in the fuselage top and bottom halves. Mount the landing gear in place. Cement the wing in place using scrap basswood for a cradle as shown on the plans. Connect the pushrod to the elevator horn and cement the stabilizer in place making sure that the elevator is in the neutral position. Mount the engine and half pan to the fuselage crutch and cement the lower fuselage half in place. Next, cement the fuselage top half in place. Cement the rudder in place and sand the entire model with #3/0 sandpaper. Hollow out the engine carburetor inlet with a ball nose router on a "moto-tool" or drill motor. Next, cut F-1 and F-2 to shape from ⅛" basswood. F-1 is used as a key to locate the half pan in place. F-2 is used to seal off the rest of the fuselage interior from fuel. Cement F-1 and F-2 into place as shown in the plans.

Now, form the tail skid to the outline shown on the plans. Rout out a slot in the solid portion of the crutch to fit a #4-40 nut. Drill a #4-40 mounting screw hole normal to the slot in the fuselage. Rout out a recess in the crutch for the tailskid. Mount the tailskid with a #4-40 screw and nut and fill in slot and recess for the tailskid with cement.

Before painting the model, lay a piece of 1/32" wide masking tape on top and bottom of the elevator hinge line to protect the hinges from paint.

FINISHING: Every modeler has his own finishing technique, but it is recommended that the procedure outlined herein be used on the Fast Miler or any speed model for durable and long-lasting finish.

Lavex synthetic enamel primer and Lavex synthetic enamel were used for a finish that cannot be touched by any high methane fuel if applied properly.

First, give the entire model a heavy brushed coat of primer and let it dry overnight. The model will look rough at this time, but do not be concerned; the finish will be nice after sanding. Use #3/o grade sandpaper to sand the first coat down. Be sure and sand down to the bare wood, filling in all of the wood pores, as this is the most important procedure in finishing the model. Give the model another brushed coat of primer. Use #320 wet or dry paper to sand, filling in all of the remaining pores. The third coat should be sprayed because brush marks will be hard to sand out. Sand the third and final coat of primer with #320 sandpaper, and finish the sanding with #400 wet or dry sandpaper to remove all scratch marks. It is recommended that the inside of the engine nacelle be brushed with a fuel-proof dope instead of primer; if the enamel is knocked off inside, the fuel will soak through the primer since it is porous—thus ruining the outside finish. Wipe the model thoroughly with a clean rag before the enamel application. Before spraying, paint with black nitrate dope the area where the bubble canopy is to be mounted. Then, cement the canopy in place. Mask off the canopy for protection from spraying.

The next operation is to spray the enamel. A note to those who have never used enamel before—extreme precaution should be taken while spraying. The enamel can easily pick up lint, dirt and bugs if not sprayed in a proper place. It is usually best to spray outside where there is no lint. Be sure to pick a day when the humidity is high—preferably just before or after a rain. Try to spray the enamel as thick as possible. Do not try to thin it down because it will run too easily. Spray on a thin coat and let it dry to a "tacky touch". Spray on another thin coat and let it dry to a "tacky touch". Now, spray on medium thick coats until finish assumes a brilliant gloss. Let the enamel dry about one week before exposure to fuel. After the paint is thoroughly dry, polish with paste wax. Do not rub the finish with rubbing compound, as this will ruin the glossy finish of the enamel.

FLYING INSTRUCTIONS: Balancing the model is one of the main considerations

(*Continued on page 38*)

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U-Control
Gas Flying Model

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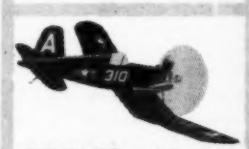

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Our designer's dream model . . . a very fast team racer with smart racer type styling. All prefab.

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Something new! This U-Control thriller drops bomb as you fly. Prefabbed w/carved fuselage.

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Beech "Bonanza" $1.95
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A real "beaut" of a model. It's authentic scale. . . . for U-Control flying. Prefab. Carved fuselage.

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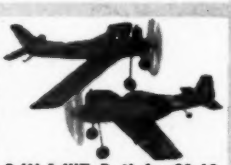

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Length 20", Beam 8"
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Terrific fly-it-yourself scale model . . . with a gull wing. All prefabbed with carved fuselage.

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SPAN: 18" For .020 to .074 Eng.
Extremely popular U-Control trainer at a big bargain price! It's profile and all prefabbed.

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Fast Miler

(*Continued from page* 34)

in Mono-line flying. As previously mentioned, some difficulty was experienced on landings because the model balanced forward of the line. Be sure and balance the model between the line and the maximum thickness of the wing. Another important factor for Mono-line models is to have perfectly free controls. This is why the masking tape is used between the elevator hinges so that the hinges will not be stiff. Use the take-off procedure as previously mentioned. Remember, you only have one lap to get into that pylon. Be careful not to inflate the pen bladder excessively so as to avoid squeezing it when the engine and pan are in place. When the tank is squeezed, it will give a false setting on the engine. Fill the tank to 25 to 30cc of fuel. This will be enough fuel to give the Fox 29R 20 to 30 laps if the needle valve is set properly.

Use a full 7-10 Tornado Plasta-coat prop, sanded and balanced properly. The Fox 29R needs no pampering as far as hot fuel is concerned. It can run on as hot a fuel as the humidity will allow you to mix. However, the engine is difficult to run in high humidity. A good standard fuel mixture is 20% castor oil, 60% nitro methane, 5% nitro benzene and 15% methanol. If you do not like to mix fuel, use "Fox Racing" fuel or "This Is It" as a commercial fuel. (For this engine and model—Editor)

BILL OF MATERIALS

Champion Pan, ¾ x 2 x 22 ½" basswood, 1 x 2 x 16 ½" hard balsa, 2 x 2 x 22 ½" hard balsa. ¼ x 3 x 14" basswood. ¼ x 3 x 7" basswood. ⅛" steel wire, 3/64" steel wire. 1¾" diameter wheels. 1 sheet of silk. 1 B-Speedmaster Mono-line Control Unit, linen cloth hinges, 6-32 round head screws (slot head recess) 2-56 round head screws (slot head recess) 4-40 flat head screws (Phillips head recess) 4-40 round head screw (Phillips head recess) 6-32 flat head screws (slot head recess) tin sheet metal.

Foreign Notes

(*Continued from page* 28)

them. Jarry-Desloges cleaned up all three speed classes with 104, 138.1 and 144.3 mph respectively.

CZECHOSLOVAKIA

A new world record in the FAI Class II Speed category (i.e. 5 c.c. or .30 cu. in.) has been claimed by Czechoslovakia. New mark is 244 km.-hr. (151.6 mph)—a useful increase on the present official record of 146 mph by Britain's Ray Gibbs. It was set by Bohumil Studeny of Brno, a name which has lately been increasingly to the fore in East European speed circles. The motor used was a reduced displacement version of the MVVS 5.6-1957. This latter is an experimental .35 glow job designed for stunt work by the famous Model Research Center at Brno. Twenty of these .35's were made during 1957 and were distributed to Czech model clubs.

NORWAY

One of the problems that confront most engine manufacturers is finding a name for a new product. How many Hornets and Wasps have there been? How many Spitfires and Atoms? It was only a matter of time before we had a "Satellite" and first

(*Continued on page* 40)

America's most popular BIG 3

U-CONTROL TRAINERS

. . . PROVEN FLYERS . . . YEAR AFTER YEAR

GM-15

PROFILE TRAINER 3

Giant 36" wing span model especially designed for engine from .19 to .36

$5.95

GM-4

PROFILE TRAINER 2

30" wing span model for engines from .14 to .19

$4.50

Flight Tested?

. . . Designed by Lou Andrews, famous U-Control gas model champion—'nuf said?

Rugged?

. . . Really built to take it—even the shock of rough landings experienced by beginners

GM-14

PROFILE TRAINER 1

The ideal model for the small engines from .049 to .099—24" wing span

$3.25

A U-Control Trainer specifically designed for every age group — from beginner to expert. The finest models ever developed for learning the fundamentals of captive flight in the shortest period of time. Fully pre-fabricated kits that go together in a jiffy — can be assembled and flown the same day. Everything included except motor, fuel tank, flying wires and liquids.

Dependable?

. . . Thousands of satisfied flyers the world over—their letters have told us so!

If not available at your Hobby Dealer send direct to factory adding 25c packing and postage in U.S.A., 40c outside U.S.A.

PAUL K. GUILLOW, Inc. Wakefield, Mass.

off the mark is Norwegian manufacturer Jan David-Andersen with a new 1 c.c. motor just so named. "Satellite" is a neat little .06 shaft-valve Diesel, beautifully made of high-grade materials in the usual David-Anderson manner. A production of 500 engines is initially planned.

AUSTRALIA

A new Australian record has just been set by speed champion Len Buck. Using Mono-line and a Mac 60 motor, Buck returned 152 mph—the fastest time ever in Australia. Mono-line is steadily gaining popularity for speed work and we hear that some team-race exponents may be planning to use it at the forthcoming 11th Australian Nationals.

IN BRIEF . .

Denmark . . . When 15-year-old Ole Christiansen set a new Danish distance record with his Hans Hansen-designed A2, he must have been agreeably surprised at his luck. The model flew 72½ miles eastward, crossing the Kattegat.

Austria . . . Oskar Czepa, former world A2 champion and honorary member of the Chicago Aeronuts, has become president of the model committee of the Austrian Aero Club. Ossie will also be Austrian delegate to the FAI.

Israel . . . A big improvement in the motor supply position for Israeli modelers has lately been effected by the acquisition of 650 West German Webra Piccolo (Half-A class) engines and 300 Webra Rekords (.09). The purchase of these was facilitated by the fact that they were obtained under the German restitution program.

West Germany . . . Johannes Graupner, biggest and most famous German model firm, has brought out a portable, hand-driven engine starter. Is a cord type starter with friction cup for spinner application.

Pee Wee Pal

(*Continued from page* 16)

of balsa very lightly before using it in construction to remove the fuzz. This is especially true of sheet balsa used for wing covering. When both side frames are completed, they should be joined at the tail and the bulkhead slipped into place. Hold together with pins until the cement is dry. While this is drying add the cross braces.

Bend the landing gear to the shape shown on the plans and cement it to the rear of the bulkhead. Apply several thick coats of cement over this attachment until the area is thick with cement. This proved successful on our model; however, if desired, strips of cloth can reinforce the cement.

Sandpaper the fuselage framework using a large block wrapped with very fine sandpaper. Re-cement all joints and then cover the fuselage with light weight Silkspan. The entire area of sheet balsa at the nose should also be covered with Silkspan for added strength.

The wing is started with the hard balsa spar which must be assembled to the proper dihedral (wing tilts up from the middle) or polyhedral (panels tilt up from center and a point well out on each wing) by using the six balsa joiners. While this is drying, the ribs can be cut to shape and then slipped into place on the spar. The addition of the diamond sectioned leading edge and trailing edge plus the sheet balsa tips completes the basic wing structure.

List of Material

No. Reqd.	Size	Material	Where Used
5	1/8" x 1/8" x 36"	hard balsa	fuselage longerons & braces, wing & stab. leading edge.
1	1/8" x 5/8" x 36"	med. balsa	wing trailing edge
2	1/8" x 2" x 36"	med. balsa	fuselage forward portion, stab. end ribs, wing tips
2	1/16" x 2" x 36"	med. balsa	rudders, wing ribs, wing & stab. leading portion covering, joiners.
1	3/32" x 2" x 4"	plywood	bulkhead
1	1/8" x 1/2" x 18"	med. balsa	stab. trailing edge
1	1/8" x 1/4" x 18"	hard balsa	stabilizer spar
1	1/8" x 5/16" x 36"	hard balsa	wing spar (taper outboard section)
1	1/16" dia. x 6"	music wire	landing gear

Miscellaneous: Light weight Silkspan, cement, 4 oz. clear dope, straight pins, one light air wheel, colored dope if desired.

Before the leading surface and center section of the wing are covered with sheet balsa the structure should be checked to insure an even foundation for the sheet balsa; especially at the leading edge and rib joints, and wing tip and rib joints. Sand the structure smooth and apply the sheet balsa after it has been sanded to about 1/20" thick. Cement this to the spar first and then to the ribs and leading edge and tip. Sand well when dry and re-cement all joints.

The stabilizer is constructed in the same manner as the wing except, of course, no dihedral is needed. Light-weight Silkspan is used to cover the wing and stabilizer. This covering should extend over the balsa sheet.

The plate-type rudders are cut from sheet balsa and the two pieces of each are cemented along the seam. When dry, the rudders should be well sanded to about 1/20" thickness. Cement the rudders to the ends of the stabilizer.

When all covering has been shrunk with water, clear dope should be applied. If contest performance is desired, only clear dope or Aero Gloss Translucent colors should be used. Our model is used as a high performance sport flier and is finished with three coats of colored dope. Despite this, the performance is equal to most contest fliers. The Pee Wee Pal does not have an engine cut-off. Flights are regulated by timing the engine run on a full tank and then running the engine on the ground for the desired length of time before launching. The Pal's predecessors have been equipped with Maeco timer tanks, fuel cut-off timers and long fuel line and all proved quite successful. If the builder does not relish cross country chases to retrieve his model, we recommend that one of these methods be used to limit the engine run.

The engine is held in place with round-head wood screws. The required down-thrust is built into the structure. However, about two degrees of right thrust should be installed before the initial flight. Slight left rudder will cause a left glide while the climb will be to the right because of the right thrust. Needless to say; if fuel-proof products were not used the entire model should receive a coat of clear fuel proofer.

Complete hand glide testing should precede powered flight. Glide should be very flat and slightly to the left. Control the gliding angle by adjusting the stabilizer angle. If the model stalls under power, increase the downthrust. Increase the right thrust if the model flies straight under power.

The Victor

(*Continued from page* 20)

proved to be the ideal combination for contest work. With the K&B .15 I used a Froom T-23A tank, and with the K&B .19, a T-23B tank.

The nose wheel structure is made up of three wires. The reason for this is so the wheel can be replaced if it is ever damaged, without removing the complete nose assembly. Cloth stitched hinges were used on the rudder and to this date show no signs of wear. They have proven friction free, reducing the amount of drag on the linkage system.

The bottom door was made up of ⅛" sheet balsa with a ¼" balsa sheet cemented on the inside of the ⅛", completely fitted to be flush with the rest of the fuselage, hinged to the front bottom and with a snap on the rear bottom.

The first Victor weighed 4 lbs. Those who build a heavier ship will find that adding ¼ inch positive incidence under the leading edge of the wing will be required. Also, the builders with heavier ships who want shorter take-offs, should move the main gear forward ¾ of an inch.

The photographs shown are of the second Victor built, equipped with a triple escapement arrangement, which appeared in the June, 1956 issue of MAN, giving full rudder, elevator and motor control.

The original Victor has been flying for the past two years on Citizenship 465 (AR) equipment, with a Babcock compound escapement, using three pencells in series, with light spring and 3/16" rubber. During that time the equipment has proven to be very reliable. The Babcock compound escapement, when new, should be broken in on the bench for about 300 turns to reduce the possibilities of a locked rudder in the air. I have followed this procedure before installing mine in the Victor, and to date, in more than 700 flights, it has never been necessary to remove it from the ship. My linkage assisted the Babcock to perform to its fullest capacity because of its suspension at only two points which are metal, one through the aluminum plate on the escapement, and the other through a metal eyelet embedded in the back of the fuselage, giving me the least possible amount of drag.

Ever since I have been on 465, I have been amazed at the amount of distrust fellow modelers have, from California to Washington, for 465 equipment. They doubt its reliability. Reliability on a long-term basis can be achieved with any

equipment only if the owner understands fully its capabilities and its limitations.

My search for reliability with 465 equipment followed the most basic rule of RC operations, and that is to keep proper adjustment at all times, and especially to maintain battery voltages well above the required minimum. I have never tampered with my equipment and have found from past experience that once I make my basic distance check, I need not touch the receiver for several flying sessions.

The main expense which is higher than average, is a replacement of A batteries after every five flights. This consists of five pencells in series, which gives me a total of 7½ volts. This expense I consider a "must" for constant reliability.

I am also a firm believer in good solder joints in running my wires to the receiver. I solder the wires to the Fahnstock clips, not inserting the wire to the clip, which may someday produce a bad connection due to dust or age.

Wiring a 465 receiver into a ship is no problem. In fact, the more wire the better as the wiring for an AR receiver acts as a receiving antenna. All wiring that is not required to move should be firmly cemented in place. When soldering to the clips, I make a 90-degree bend, ¼" from the soldered joint to absorb vibration in flight and on landings, to prevent the possibility of fatiguing wire.

As the plans indicate, I use a Burgess K45 battery for my B supply rather than hearing-aid batteries for several reasons. One, by using a K45, I charge it only once a year, which means it can be permanently installed in the airplane, with no worries of battery cases, etc. The second reason came from past experience, where I found on quite a few occasions that the wafers in hearing-aid batteries would lose contact with each other, thereby reducing my voltage. The third reason is that the Victor will handle the big battery with no ill effect on its flying characteristics.

The Sigma 4F relay has also proven very dependable if set according to the instructions which are supplied with the AR receiver. I found no need to suppress the spark at the relay, but very often clean the relay points with carbon-tet.

One problem with 465 is that you cannot have a ship painted with any type of metallic paint. In this case, I am referring to any paint that may contain aluminum dust powder. When the ship is so painted, you will get effective operation up to approximately 200 feet. Beyond that point, the ship loses any signal that might have been transmitted because of the paint's deflecting the directional signal coming from the transmitter. My experience with metallic paint was very interesting because one would never know the airplane was not receiving a signal until it was beyond the 200-foot point. All ground checks would indicate the receiver's being in perfect alignment with the transmitter.

In all my hook-ups, I used Belden "8524" which is a number 22, seven-strand, wire. All my tunings have been per instructions supplied with the AR receiver, which is very simple, as there are only two adjustments, idling and tuning.

The idling core is turned in or out until it reaches its lowest point on the meter with the receiver on. When the lowest valley has been found, turn the core until the needle starts to rise, stop at this point. If the needle wobbles a little, don't worry; with this setting, the range is doubly effective. Some receivers will come close to the instructions which indicate a setting of from .25 M.A. to .30 M.A., but others

will show a valley below that which is recommended. It isn't required that you set, per their instructions, as long as the valley is found and set accordingly.

For the tuning adjustment, turn the transmitter on with antenna plugged in and have a helper walk out about 400 feet and adjust the tuning screw for a maximum plate current rise. I have the helper point the bottom of the transmitter towards me, holding both the transmitter and airplane at shoulder height. By making a tuning adjustment this way, I know that, in flight, with the antenna pointed towards the ship, I will have doubled the range.

One note of caution. Tuning may change the idling adjustment up or down and the core may have to be set again. Once this is done the ship is ready to fly—there is no need for a second tuning adjustment. Also, never point the antenna directly at the ship when within a few feet of it as the directional signal is so strong it will have a tendency to paralyze the receiver. One last note is my transmitting antenna. I always keep it polished, using any metal polish, Dupont 7 rubbing compound, or Blitz cloth which is used to bring aluminum to a high luster. My reasoning is that a TV antenna produces better reception when the antenna is new and not corroded.

In closing, I have found 465 AR equipment to be very reliable. I feel the mistrust today in this equipment is due only to the owner's not understanding fully its operations. I welcome any questions or problems on this equipment which the owner may have.

Engine Review

(*Continued from page* 30)

whole mess comes to a grinding halt. More commonly, however, this thermal instability manifests itself less obviously by simply limiting performance to a level where combustion temperature and friction have found a compromise. Upset the status quo by running a lean needle setting or hotter fuel and the machinery dies, as every speed flier knows.

The essence of breaking in an engine quickly is finding and never exceeding this point of compromise. As everything wears itself to the right fit, the point of compromise moves up the power scale until volumetric efficiency prevents any further improvement and the engine can be considered as broken in.

The obvious solution to all this is to manufacture the piston to be the correct size and shape at operating temperature. This is what is commonly done in other fields, and advantage is taken of the light weight and thermal conductivity of light alloys, despite their high co-efficient of expansion, to improve other characteristics of the engine. However, the resulting cold fit of the piston is such that there is practically no compression at cranking speed, and starting is unacceptably difficult. This problem is solved by providing a number of piston rings for sealing purposes which are, in fact, very shallow lapped pistons, but with one important difference. They are split, and spring outwards to maintain contact with the cylinder walls, and accommodate themselves to varying conditions of fit caused by temperature fluctuation. Alloy pistons and rings are undoubtedly the answer if one can afford them, and the fact that many records are currently held by lapped piston engines is simply due, in our view, to the absence of thorough development work on piston rings of suitable sizes, because of the current

lack of demand for expensive high performance engines. Small piston ring design is based on large ring design parameters which, while satisfactory, are not by any means entirely suitable for our purposes, and we may yet see notable improvements if there is a revival of racing engine interest.

However, to get back to the point, the piston of our test engine is interesting because it is hardened and yet features a swaged in conrod ball joint. Swaging can only be carried out on malleable material, and hardening must take place before the conrod is fitted otherwise the rod will be too brittle. The solution in this case consists of copper plating the piston and either masking the skirt or removing the copper deposit from the skirt before carburizing the piston. This process consists of heating the work to cherry red heat in a material containing free carbon which penetrates the exposed surfaces to a depth determined by the duration of exposure. Quenching the work in water produces a glass hard case on the unplated skirt while leaving the plated surfaces in their original soft condition so that the conrod can be fitted. Finally the skirt is finished to size with the rod installed so that any distortion from swaging and hardening can be removed in the process. The most outstanding feature of the Thimbledrome range of engines is the system of carburetion and admission control, and much of their remarkable performance is due to the thorough and ingenious development work carried out in this field. The detail design in the fuel tank and rear cover of the .020 is especially noteworthy.

The main unit comprises a cup, turned from bar and anodized red, which has a hollow stem in the middle communicating with a boss on the undersurface of the cup which fits into and forms the rear cover of the crankcase. This boss is recessed on its face and the internal diameter has a snap-ring groove. Behind the snap ring goes a reed valve shaped like a plus sign, the center of which covers the end of the hollow stem or induction pipe. The reed is blanked from 1/1000 brass shim stock, and in operation moves to and fro, as well as flexing, so that the mixture can flow between the arms of the plus sign. To prevent overstress the reed is limited in its deflection by one end of the circlip passing across its center. The fact that the outside diameter of the boss is only ⅝" will give an idea of the fascinating neatness of the detail work in this engine.

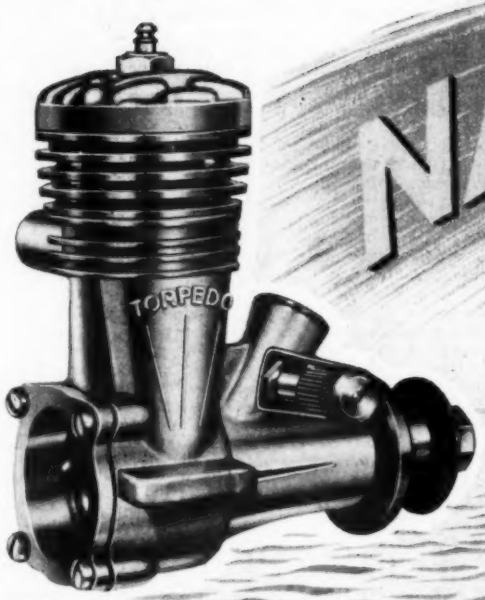
At the upper rim of the cup where it joins the tank blackplate is a most unusual and accurate example of machining. It is necessary to have at this joint a fuel-tight seal which not only tightens down to a very precise dead length, but which also holds the backplate absolutely concentric with the tank. These requirements are dictated by the most ingenious system of carburetion we have seen on a model engine. In principle the induction pipe is in two pieces, one being the stem in the tank, and the other the hole in the center of the backplate. However these two pieces are prevented from touching by the joint at the rim of the cup, thus leaving in effect a crack around the induction pipe big enough to take a cigarette paper. This tiny annular crack is the jet, and its width is controlled by the tank to backplate joint. A gasket varies in thickness, and screws do not provide a precise concentric location, therefore, something crafty in the way of joints was called for, and accomplished by turning a vee groove in the face of the tank rim and a mating male vee on the face of the backplate. When the four retaining screws are tightened the vees insure that everything pulls up to the right relationship.

The admission of fuel to the annular jet is controlled by a positive shut-off needle valve which regulates flow to a chamber formed by a shoulder on the end of the induction pipe stem. Fuel gets to the needle valve through a small piece of plastic tubing, complete with anti-kink spring, inside the tank and extending to a suitable pick-up point.

The backplate unit is an intricate little diecasting incorporating filler and vent, four-point radial mounting lugs, and counterbored bosses for the tank to crankcase retaining screws. The needle valve body is a tiny steel insert pressed into a bore in this casting to provide long wearing, very fine threads in order to give reasonable latitude in adjusting such microscopic quantities of fuel. The needle itself is of typical Thimbledrome pattern with a coil spring locking device.

Now those hardy souls, if any, who have been able to follow this marathon description, and understand the workings of this extremely clever fuel-air mixer are no doubt wondering how air gets to a hole in the middle of a radial mounting plate and probably visualize fuel under the tissue and internal model rot. This time we have a Thimbledrome which keeps the innards

(*Continued on page* 46)



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TORPEDO .15 $10.95

William Glick, co-partner, and Kenneth Willard, designer of the "Avalon Breathless" and organizer of the Avalon Bay crossing, with plane before take-off.

"There is a first time for everything" and Ken Willard with the aid of his co-partner, Bill Glick, were the first to fly a Radio Control model across the Catalina Channel—**NON-STOP!** The plane was especially designed for the task and powered by a **Torpedo .15** engine. Named the *"Avalon Breathless,"* it took off from the Long Beach breakwater and flew by radio control from their boat, passing over Lone Point, Catalina, a distance of 21 miles, just 48 minutes later. As the plane still had almost half of its supply of **Supersonic "100"** left they headed it toward Avalon Bay, 7 miles away, where they put on a show for the townspeople in the harbor. All in all, the *"Avalon Breathless"* was in the air a total of 1 hour and 40 minutes.

It is performances such as this that make the **Torpedo Engines** the champions they are—small wonder they rate the title **"National Champion"*** year after year. Powerful, fast, smooth, easy to start, the **Torpedo Engines** *can be depended upon* in any class events or special flights such as this Catalina crossing.

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For details of this amazing flight read the complete story in the January and this month's issue of Model Airplane News.

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dry. The backplate has a passage, recessed in its face, connecting from the intake to the outside world, and it is chokeable. Finally, the whole unit can be rotated in increments of ninety degrees, but the vent positions dictate a top position for the needle knob.

In the absence of any useful figures for this engine we can only repeat that handling and starting is better than that of many good large engines, and the steam available will be a pleasant surprise. It could be the beginning of a new trend, but what a job for the manufacturers!

Flight To Catalina

(*Continued from page* 15)

fittings, with a final T fitting feeding the fuel to the fuel regulator. Running tests showed this system to be completely reliable so long as the fuel regulator was kept clean. The tests also showed that at cruising rpm the .29 would run almost seven minutes on one ounce of fuel!

We made the first test flight on April 20th at Hansen Dam. A water taxi test showed that we had complete control at both low speed and high speed, but no control at intermediate speeds on the water. This was normal. I was flying the airplane since this control system provided return to neutral on both elevators and rudder, unlike the 3-channel trimmable of the preceding season.

The airplane made a nice straight run and didn't appear as though it was going to take off, so I gave it up elevator. It lifted into the air and I had a tiger by the tail. I thought I had slowed the airplane down in the rebuilding process, but I hadn't. It was nose-heavy and had a bad right turn. However, I managed to keep it in the air until the engine quit. Then the wing tip touched the water and the airplane cartwheeled.

The following weekend I had increased the angle between the wing and stabilizer. We had three excellent test flights, except that whenever the airplane got about 50 feet altitude both the rudder and elevator escapements began skipping through as though the relays in the radio were chattering. Since it only happened at altitude, we knew that the radio must be receiving a signal which we weren't sending. You could hear music!

Babcock devised a fix to the antenna system which eliminated this interference. In the meantime, I had contacted the Chief of Police at Newport Beach and obtained permission to hand launch the flying boat from the end of the Newport Beach pier. No open-sea take-offs!

On May 18th we made the final test flights, complete with external tanks. The first test flight was a heart breaker because the engine quit when the flying boat was over land and, in attempting to maneuver it so that it would get back over the water, I made a turn close to the ground, the nose dropped, and the airplane dived in with a resounding crash, but only trivial damage. We increased the wing-stabilizer angle. The second flight was still too fast, so we added a little weight to the tail. The next two flights were perfect. The attempt was scheduled for the following Saturday, May 25th.

The weather was perfect, the launch was perfect; the operational plan worked according to schedule. There were only two things which were not as we had planned. First, our estimate of the flying boat's speed was too conservative. We were doing 30 knots in the boat, but the flying boat got about five knots faster. And I had set the engine at what I had

thought a good cruising rpm so the flying boat would gain about 50 feet per minute altitude. Instead it was gaining about 100 feet per minute, and I didn't dare reduce the engine speed for fear of killing it. I was not able to hear the airplane's engine because of the boat engine.

After maneuvering into a position just above and behind the chase boat while we maintained a straight course, I kept the flying boat flying an S pattern. As the airplane got higher I decided to bring it down with down elevator. The airplane speed picked up to about 45 to 50, and it started into a high speed left turn. I gave it right rudder and it came around.

The next time it got too high I again gave it down elevator, bringing it down 100 feet, and again it went into the high speed left turn. I pushed the button for right rudder. Unfortunately, the rudder skipped through to left, and because of the high speed of the airplane, it was headed away from us at a speed of about 45 to 50. We were doing about 30 knots and, therefore, our rate of separation was around 75 knots, and it was only a matter of a second or so before the airplane was out of range. The range on our equipment was about ⅜ of a mile.

By this time the flying boat was in a left turn with the nose down in a vicious spiral, losing altitude. This was according to the design plan, but because of the high speed, before we could turn our chase boat around and get back into range, the flying boat was perilously close to the water. I tried to give it right rudder, but again we were not quite in range, and the rudder fluttered from right into left. This served to accentuate the rate of descent. We were speeding towards it as fast as we could go. I didn't dare give another rudder command. When the airplane was about 10 feet off the water I did give it up elevator, and it took this command, but just a second too late. The wing tip hit the water and in she went. The wing broke on impact, but no other damage was sustained. This was enough to make even the most persistent of men decide that it was hardly worth it.

The primary reason for the failure was the limited range. Also, the flying boat was still faster than the chase boat, which made the operation critical. Although I had compensated for the speed and the climb by establishing a flight path which would keep the airplane fairly well over and behind the boat, it would have been better to have kept the airplane up above and ahead of the boat; then in the event of a miscommand the airplane would have turned back into range.

Excitement in a project such as this demanded that we have a more forgiving type of airplane!

The airplane which answered the description would be an enlarged "Breathless" with no landing gear. It would recover from any flight altitude without assistance, and it had no bad characteristics. In addition, the upswept nose meant it could make a water landing without damage. So, we enlarged it to 6′ wing version.

We used the same fuel system. We settled on rudder only control, using a Babcock supercompound escapement with the third position wired to a motor control operating a Bramco throttle on a K & B .19. The old reliable Babcock BCR-3 single channel tone receiver solved the range problem. So, what started out to be a sort of idealistic project with a

flying boat taking off from the water close by the mainland and landing in the water at Avalon, reverted to a simple low-speed guided missile type of approach.

Bud Hartranft, who has seen some of the test flights of the flying boat, offered to build the fuselage. I had a horizontal tail surface exactly the right size. Bill Glick and I put together a new wing in one day. I used the 6512, a high-lift, under-cambered airfoil. This would help slow down the airplane.

About this time another group of modelers attempted the flight to Catalina, but failed.

Our airplane weighed out at 4½ lbs., not including fuel. Test flights proved the .19 was far too powerful, so we installed a K & B .15, ideal for the purpose. We would not have to carry as much fuel.

After a series of flight and bench tests to see how the engine would handle the fuel pressure system, we were ready. To be absolutely sure, we decided to make a flight over land which essentially would simulate the channel flight. Since we were going to make a fairly long flight we decided to include a take-off so that the flight would qualify as an endurance attempt in the LARKS endurance competition.

Thursday, July 11th, we took the "Avalon Breathless" out to Los Angeles Model Airport. Three attempts from the 200' runway, which were unsuccessful, then went up to the access road which ran along the river bank and had a successful take-off. The airplane flew for about 17 minutes when the engine quit. In setting the needle valve at maximum rpm for take-off the pressure variation was greater than the engine could handle and it leaned out. This time I adjusted the needle valve so the engine was on the ragged edge of running rich. This cut the rpm down. The plane took 22 seconds and almost 600' of the roadway before it slowly lifted. Even after about five minutes of flying it was only about 20' high; but gradually, as the fuel load dropped, and the fuel pressure also dropped, the engine leaned out and ran better, until later in the flight we actually had to bring the airplane down from altitude several times.

This flight lasted 1 hour and 37 minutes. Engine operation at low speed was marginal. Most of the flight was made with the engine at high speed so it would continue to run. Following in a convertible car we found that speed was only about 20 mph. We decided not to use engine speed control. Instead, we converted the Bonner SN escapement to operate the elevator. This operation was sequential up and down, and I also offset the elevator torque rod so that following up elevator we had slight up trim and following down elevator we had slight down trim.

A few test flights showed that it was exactly what we needed. It eliminated the problem of whether the engine would be in high or low speed since we would not be able to hear the engine, and it also eliminated the possibility of the engine starving at low speed. It did, however introduce a new problem. We had to make sure that the fuel system would feed properly to the engine during moderately violent maneuvers, since the single engine speed meant that on the last half of the flight to Catalina we would have to spin the airplane down from altitude. Flight tests proved that the system would work.

Bucky and Bill Bryan supplied the chase boat.

Next came the problem of a suitable launching site. Although it might be feasible to launch right from the boat, this could be very critical. To use the seaplane ramp at the Long Beach Naval Station we contacted the commanding officer and the arrangements were completed.

Practice in full-load launches would be good, so we tried several. Quite successful, but at certain engine speeds a resonant vibration between the engine and the escapement caused the escapement to run through. We tried several corrective measures, none of which worked, and during the last test flight after one dive where the engine speeded up to the resonant vibration, the escapement vibrated through into an up position, causing a low altitude stall, and the airplane whip-stalled and dived into the ground under power. It was a sickening sight, after all of our work, but, surprisingly enough, the major structure remained intact. The batteries and radio had broken loose and jammed forward, breaking all of the tubes in the radio and jamming the escapement. There was only one week left before the scheduled channel attempt.

Tuesday morning, July 23rd, we put the plane in the air. There was no vibration problem. While waiting for the engine to quit the rudder suddenly began to flutter back and forth. I looked at my watch, and my first reaction was that I was getting some interference from the city transmitter. About that time the engine ran out of gas, and even without the engine running the rudder continued to flutter through. The airplane was headed for a head-on crash with the river bank, so I had to attempt a turn, knowing that whenever I pushed the button I might crash. Finally got a right turn to bring the airplane back over the field. A slight gust of wind started to turn it back towards the river, so I tried again. This time I got up elevator which pulled the airplane into a stall and it dived into the ground once more. The wing broke; also the radio and battery mount had come loose. This was almost more than I could stand. Here it was Tuesday, and we were going to attempt the channel on Saturday, and I had a broken airplane! And why did the radio malfunction? I plugged in the radio and suddenly the escapement began to go through! I put on the ear phones. A "noise" which was causing the radio to malfunction. The bonding wire to the escapement frame had crystalized and

(*Continued on page* 50)

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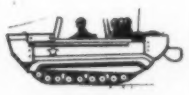
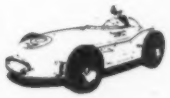


PM24 Army Weasel

PM22 Army Truck

PA26 Cessna 180



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broken loose, and the escapement's own "noise" was causing it to go through.

By 5 o'clock in the afternoon the repairs were finished. We put in two test flights. We took the airplane home, cleaned it, put it away. The next flight would be an attempt at the channel!

Friday, July 26th, Bill Glick, John Shearer and myself waited for Bucky Bryan to show up with the boat. Bucky was supposed to arrive about 6:00. He finally arrived around 9 p.m., too late to go over to the Naval Station for a pre-flight briefing. And the boat was not running right! Bucky was sure that he could have the boat ready in time for the Saturday morning take-off. We got to bed around midnight. At 3:30, we all got up and proceeded to the City Yacht Anchorage where Bucky, Bill, and Bucky's wife boarded the speedboat and started over to the Long Beach Naval Station. Bill Glick, John Shearer and myself drove over to the station and assembled at the launching point. It was about 20 minutes to six.

The sky was overcast at about 6-700 feet, visibility about three miles, a light breeze blowing in from the sea. We made the decision to launch directly out into the harbor, so we set up the airplane, checked out the radio and the control system. Then I wound in 2,100 turns on the rudder escapement and about 1,200 on the elevator escapement. About 1,800 rudder commands could be used, and 800 elevator commands.

We put about four oz. of fuel into the tanks, ran the engine to establish a needle valve setting for the end of the flight. If I held the nose of the airplane up, the pressure system could not overcome the pull of gravity and it was possible to stop the engine. If I could keep the airplane out of a whip-stall during the flight, I should be able to kill the engine with a whip-stall at the end of the flight. As it later turned out, this feature of the fuel system was very useful.

We filled up the tanks with 20 oz. I ran it until I was sure that all air bubbles were out of the fuel system. We were ready for the launch! The speed boat was pulled up alongside the seaplane ramp, and everybody except John Shearer, the photographer, and myself were aboard. I stood back about 50 feet from the edge of the water, ran forward and gave the Avalon Breathless a mightly heave out over the water. I brought it back and around in a wide circle. As soon as I was sure that the airplane was above all obstacles, I headed it back out to sea and stepped aboard the boat. We were on our way!

The plane zooming along at about 24 mph. People on small boats and some of the ocean freighters watched with amazement as we guided the airplane toward the west entrance to the harbor.

The airplane was gradually losing altitude! This was a serious problem—the engine was not functioning properly.

Fearing engine failure, I made a difficult decision. We had to bring down the airplane and start over. So I nosed down slightly, picked up speed, then pulled up into a slight stall. The engine stopped as if there were a fuel cutoff. The plane landed on the long upswept nose, bounced slightly and settled into the water—a perfect ditch job. We put in a new fuel regulator and a new spark plug.

Should we return and launch from the ramp again? Or should we launch from the speedboat as others had tried before us and failed? It was almost a quarter to eight, we knew that a wind would be coming up.

I decided to try a launch from the speedboat. We went through a dry run where I simulated starting the engine, turned the airplane over to Bill Glick while I took up a position in the forward compartment of the boat, where he handed the airplane back to me. Then, holding the airplane above my head I told Bucky to gradually increase the speed until I could feel the airplane trying to lift out of my hand. By then the boat was bouncing slightly; however, it could be done.

I started the engine, readjusted the needle valve for the new fuel regulator as best I could, knowing that I would have to rely on the fuel regulator to accept the difference in pressure from full tanks to empty tanks, since we were not going to completely empty the tanks and refill them. I ran the engine for about six minutes, holding the airplane in every conceivable altitude.

Now we could repeat the procedure used in the dry run. As Bucky slowly gained speed with the speedboat I could feel the airplane straining to get out of my hand. Finally, when I could just barely hold on to it, I very slowly launched it into the air with the right wing slightly low. The timing was perfect and the airplane rose steadily, but slowly, and turned away from the speedboat, as anticipated. It was 8:05.

We had made the launch from the speedboat parallel to the ground swell of the ocean, and as soon as the airplane had safe altitude, we set course for Lone Point. Visibility was about 2½ miles, so we had to rely on a compass heading. The overcast sky would occasionally show a small break—the beginning of the wind!

For the next 35 minutes everything was fine except my nerves. As the plane would approach the bottom of the overcast I would give it down elevator, bring it back down to about 100 feet altitude, then was careful not to let it zoom. I had to dive down about five times during this 35 minute interval.

I began to relax. I looked ahead for the first time, and there was the Island. As we approached the Island, the overcast broke and we were flying in beautiful clear weather. When we were about three miles off shore, I turned the transmitter over to Bill Glick.

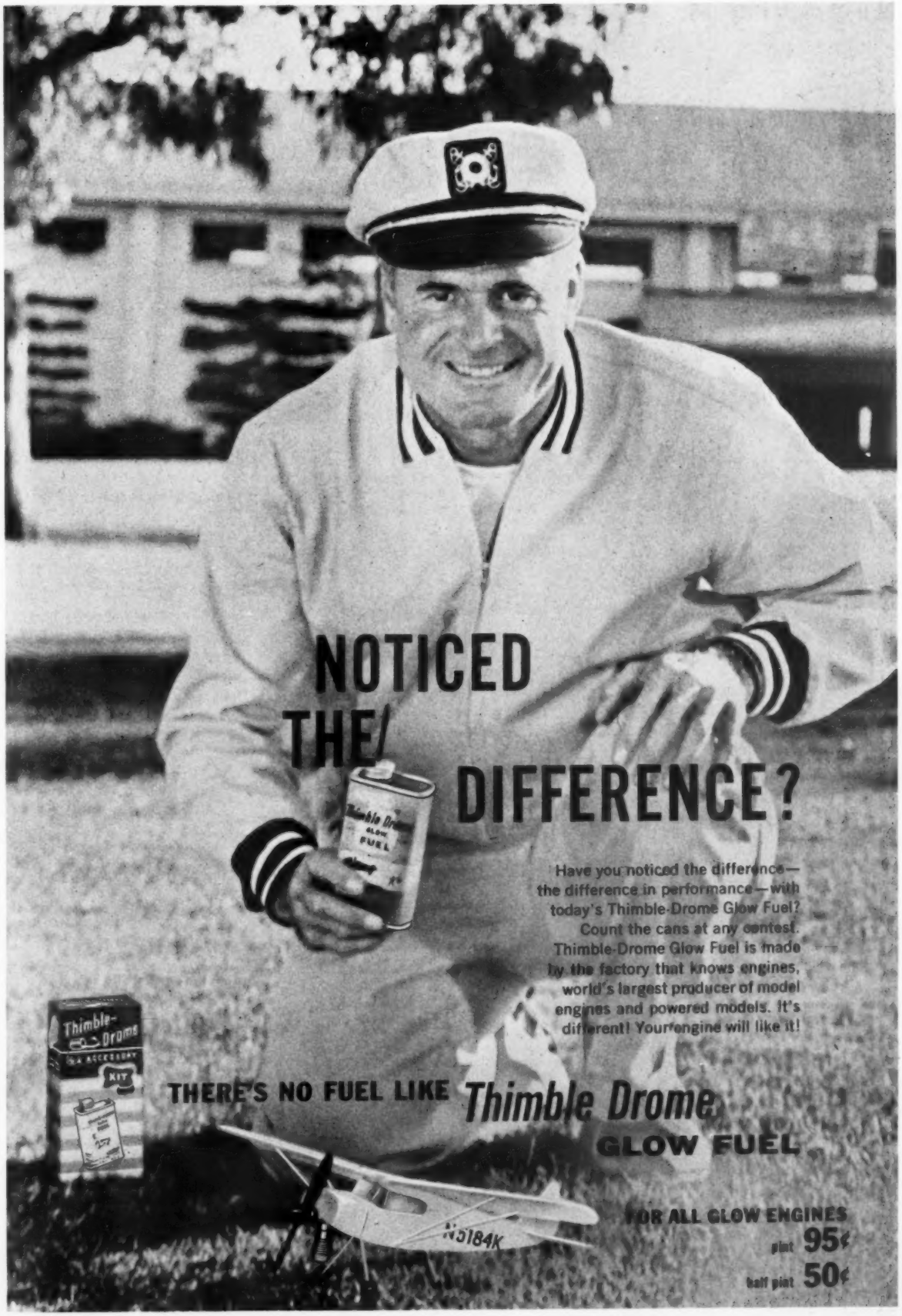
Bill flew the airplane for about five minutes and then he attempted to make a left turn to correct the course but he didn't press the button fast enough. The escapement went through to up elevator. The airplane's nose went up. Bill rapidly handed me the transmitter. It was a tense moment. Suppose the engine stopped.

Only a few minutes later we were just a few hundred yards off shore from Lone Point. The objective was achieved; we had crossed the channel! It was 8:53 —48 minutes after our launch by the breakwater. Bill Glick's grin went completely around his head. We let out a mighty shout "We made it!" For a moment I just let the airplane fly by itself while we all shook hands around. Bucky and Bill Bryan, and Bucky's wife, Cherie, were almost as excited as we were; so was John Shearer.

Meanwhile, I had occasionally stopped to keep the airplane from flying into the cliffs. It had only taken us 48 minutes, and we knew we had almost two hours of fuel aboard the airplane. Should we turn around and return to the Naval Station, or should we proceed down the coast towards Avalon?

We chose the latter and then started

(*Continued on page* 52)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to put the "frosting on the cake". As we went down the coast of the Island I brought the airplane down so that John could get some pictures of it flying along the coastline. Then we came to White's Cove, a popular fishing spot. Here I buzzed a few of the fishing boats. They waved to us and we continued on our way to Avalon. As we rounded the point, and the Casino in Avalon Harbor came into sight, we knew that we not only were going to have a successful channel crossing, but we were also going to make it to Avalon. I brought the airplane down in a dive over the Casino, out over the water and pulled the nose up into the victory loop. It was so much fun that I did it again. There were hundreds of people aboard the small craft in the harbor. They were watching with great interest and waving to us as we would run the speedboat past them.

Finally we shut the speedboat down and then, just sitting offshore in the harbor, I stooged around with the airplane, just having a big time.

All of a sudden I lost control. It was a moment of panic until I suddenly remembered and said "Bill, hand me another transmitter." We had run the transmitter batteries completely down through this long flight. The transmitter with the fresh batteries immediately picked up the airplane. I decided to land. I could not kill the engine!

This meant zooming and diving fairly close to the water. Once I thought I had it made but the airplane picked up speed and headed for a large vacht. I pressed the button twice for left rudder but I pressed it too rapidly, and the escapement went to right rudder. As luck would have it, the right wing tip of the airplane brushed the high radio antenna on the stern of the yacht. This spun the airplane around and it dropped into the bay alongside the yacht.

It was 9:45 a.m. The airplane had been in the air for one hour and 40 minutes. After more than two years of effort our mission was accomplished. In grand style!

When Color Schemes Were GAY!

(*Continued from page* 18)

walk or root and angled back to the trailing edge.

Some of the Curtiss airplanes such as the Goshawk SF11C and BF2C series had their chevrons painted on the wing in reverse order—that is the narrow part of the V was at the center section cut-out. This reversed chevron was usually found on the fighter-bomber types.

The U.S. insignia (blue circle, white star, red dot) was located one diameter in from each wing tip on the upper wing and extended from just aft of the leading edge to the aileron hinge line. The position of the stars on the lower wing varied from an extreme tip position on "Goshawk" types to ¾ of the diameter inboard on Grumman and Boeing fighters.

The basically silver color of U.S. Navy airplanes dated from the first World War when Navy DH-4's were doped all silver. In the 1920's and early 1930's, while the fabric-covered areas remained silver, the struts, fuselage metal paneling, and engine cowlings were painted Navy gray (a very light gray). This color scheme would be applicable to Boeing fighters, Vought biplanes, early models of Grumman fighters and other shipboard aircraft of this period. About 1937, when the Vought SB2U series entered service in numbers, the fuselage,

metal paneling, engine cowlings and fabric covered areas of the fuselage were again painted all silver.

The identification and serial numbers on carrier airplanes were black except when the fuselage band or tail was painted a dark color. In this case any numbers or letters on these dark surfaces were painted white, including the hyphens. The Vought SB2U-1 was a striking example of Navy carrier color schemes and markings. This plane was the first of the low wing monoplanes to be accepted by the Navy for carrier duty. Carrier airplanes before the Vought SB2U-1 were biplanes without exception. Biplanes had found great favor in Navy Circles because of their tremendous strength and low wing loading which resulted in a low landing speed vital to carrier operation. Vought solved the problem of the then considered prohibitively high landing speed of monoplanes by installing landing flaps on the SB2U-1. The biplane's compact size also allowed more airplanes to be parked on a hangar or flight deck. The SB2U-1 also incorporated vertical folding wings. While folding wings was not a new idea—early biplane Martin torpedo bombers had horizontal folding wings—they reduced the space requirements of the parked airplane to even less than the space required by the compact biplane. Yet these folding wings were rugged enough to stand the strain of dive bombing and rough carrier landings.

The SB2U-1 was from the U.S.S. Saratoga's (white tails) bombing squadron VB-3—the "Top Hat" squadron, noted for its proficiency and "esprit de corps." Since this airplane was flown by a flight leader it carried a full cowl band plus a fuselage band in green. The 3B-13 on the fuselage side identified the (3) squadron as a (B)

bombing squadron and plane (13). The black plane number 13 was also repeated outboard of the red wing stripes on both panels of the wing.

Similarly, the airplane marked 5-T-7, A Douglas TBD, is identified as a flight leader of Torpedo Squadron 5, U.S.S. Yorktown (tail insignia red). Photo shows the cowling markings of the flight leader's wing men. Plane #8's upper half of the cowling is painted blue while plane #9's lower half of the cowling is painted blue. Only the flight leader's and squadron commander's had fully painted engine cowlings. The fuselage band was also reserved for leaders and commanders. These markings not only were colorful but they facilitated assembly and identification of squadrons and flights.

One unusual marking on the TBD's is the large white and black shaded "E" below the cockpit greenhouse. This "E" is the Navy award for efficiency which is won in annual competition among Navy squadrons. Table #2 gives a complete breakdown of squadron and flight color identification within a typical carrier squadron.

Executive (V.I.P.) aircraft on carriers were painted differently than any other Navy plane. The wings remained the standard silver and yellow-orange, but the fuselage, struts, engine cowling and wheel centers or wheel covers were painted Navy blue (a dark glossy blue). There were no squadron or plane number markings and no fuselage or cowl bands. The tail group, however, was painted according to the base carrier colors. The Admiral's insignia was painted below the rear cockpit and consisted of an upright red rectangle thinly outlined in white with the appropriate number of small stars (two for a rear-admiral) painted in a vertical row on the red background. In full size, the insignia was about 12 x 18 inches. The U.S. NAVY lettering on the fuselage was about twice normal size (in white) forward and under the horizontal tail.

The photograph of a Navy SF11C-3, pictures a Hawk during acceptance trials. Therefore, neither the tail group or cowling show any carrier or flight colors. The U.S.S. Ranger (tails willow green) did have, in 1934, a squadron of Goshawks (VF-3B). Any modelers painting a Goshawk in Ranger colors would use the identification 3-F-1, for example on the fuselage side, with the appropriate cowl and fuselage bands (red in this case). The propeller tips were painted in colored bands of red, white and blue. This painting was not merely decorative; it served as a visual warning to mechanics and plane handlers on a crowded flight deck to stay clear of these whirling blades.

Acknowledgments are given with thanks to the U.S. Navy for information and photos supplied and also to Grumman, Boeing and Douglas aircraft companies for photos of their airplanes.

AS WE GO TO PRESS

Word from Robert Drews that his Victor has completed 1,200 flights (Drews counts only those flights in which a full tank was run off). Since its first flight in July, 1955, the Victor has been in 16 contests, taking 7 firsts, 4 seconds, 3 thirds—only twice failed to place.

To the many readers who still want Ram Rod plans, a reprinting has been made. (Ram Rod 250, Half A.) Our apologies for being caught with flaps down!

Radio Control News

(*Continued from page 26*)

tested, 70ma according to the manufacturer) and this rises but a few mils when the mechanism is completely stalled. The actual power consumed is about ½ to ⅔ that of the other type actuators. This is a completely new concept in actuators and it looks promising.

• • •

One of the big debates is what kind of an audio circuit should be used for stability when modulating a reed transmitter. The major problems are drifting of the audio frequencies when temperature and/or supply voltages change. Change in temperature is not too much of a problem, considering the range of about 80 degrees over which we operate. Several English circuits have shown the use of a phase-shift oscillator for generating the audio frequency. Stability is within the tolerance of a cycle or two over a B-supply range of 80 to 135v and a filament-supply range of from 1 to 1⅛ volts.

• • •

Mr. Bill Grogan presented a very simple but effective charger for some of the new miniature rechargeable batteries, in the DCRC Newsletter. The DCRC group has practically pioneered the use and servicing of most of these new batteries. Fig. 3 shows the electrical circuit. The selenium rectifier is a regular television type with a 400 to 500ma rating. The lamp bulb is mounted in a porcelain socket and the wattage size is chosen from Fig. 4. For example, to charge a Saft Cell, type 1-VO-.8, or up to 6 in series, a 75-watt lamp may be used with a charge rate of 275ma for 2 hours and 40 minutes, followed by a

(*Continued on page 57*)

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these two beauties were designed by George Aldrich, America's greatest stunt champion!

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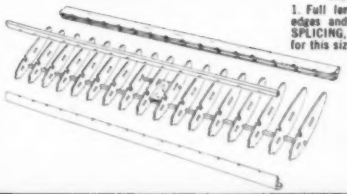

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- 1954—3rd in Nationals Open
- 1954—3rd in Nationals Senior
- 1953 WINNER Nationals Senior Stunt
- 1952 WINNER Nationals Stunt
- 1951 WINNER International Stunt

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PLAN OF THE MONTH

21. FAST MILER: U/C Proto, .29.
PEE WEE PAL: .02 FF sport.
THE VICTOR: RC, RUD., .15-.19.
The Proto Racer is tops; 1200 flights on Victor.

2. COMPER SWIFT: ½A, FF, Scale.
MULVIHILL WINNER: Rubber.
THE LIEUTENANT: UC Stunt, .29-.35.
If it's scale you like, the Swift is a wonder!

3. BUSTER: Rubber, Sport
THIRTEEN: UC Stunt, .29-.35.
VOUGHT SBU-2: UC, Scale, .19-.29.
Buster. Ideal for beginners on way up.

4. SURE FUN: UC Sport, .29-.35
PROFILE SILVAIRE: FF Profile, ½A.
ZEPHYR: Rubber, Fuselage
Control line on floats. Sport Gassie.

5. SPACE TIGER: Free Flight, .15
CURTISS RACER: UC, .19-.25
PUSS MOTH: ½A Free Flight
Scale, U-control or free flight— beauties.

6. HIGGINS CABIN CRUISER: RC Boat, .09-.19.
FOKKER D7: Scale, U/C, .29-.51.
The great all-time favorite? Try the Fokker D-7.

7. WORLD CHAMP GL.: Nordic Winner.
HI BOY: Cabin Stunt, Palmer-Goyat, .29-.35
POW WOW: Bob Palmer stunt, .29-.35
Collector's item—two Palmer models!

8. GEE BEE: Scale U/C, .19-.25.
DRAKE: FF, flying boat, .049.
DURANITA: FF, bipe, .049.
More people built the Drake than any other ship.

9. AEROCOM'DER: Scale, U/C, 2 .15.
MARS: Bob Palmer stunt, .29-.35.
NOBLER: Aldrich's Nats Winner, Stunt, .29-.35. **Palmer and Aldrich, plus a twin ukie. Imagine!**

10. SMOG HOG: Bonner's Multi RC, .19-.35.
STRATOLINER: 2 Half A, U/C.
GUARDIAN: U/C Scale, .29 up.
Greatest Multi RC of all time—a beauty!

11. GAMBLER: Mirror Stunt Winner, .29-.35.
DOUGLAS B-66: ducted fan FF, .049.
B-66, the ducted fan job that beats all others.

12. WHIRLING WINGS: Sikorsky XH-5, .15, 'copter.
BREEZY: Small field RC, .049.
SPITFIRE: Stunt, semi-scale, .29-.35.
P. Schoenky, 'copter master-his Sikorsky!

13. T-CRAFT: FF scale, .049.
FENO: Combat, stunt, .29-35.
PADDY'S WAGON: Contest FF, .049.
Paddy's Wagon—one contest job ok for beginner.

14. HEATH PARASOL: RC, FF, Scale, .075 .09.
GUARDIAN: Nats carrier winner, .29's.
SHARPIE: FF Sport, .02-.049.
—Guardian a dilly.

15. RE-8: WW1, U/C. .29-.35.
FLAPPING WINGS: Rubber, ornithopter.
BOOMER: FF, sport, pusher, .049.
Can planes fly like birds? Ornithopter sure does.

16. DRAGGIN: U/C Stunt .049.
BLACKBURN: 1912 Scale FF .049.
ASCENDER: Contest FF .049.
Wind in the wires. Goggles. Oh, that Blackburn.

17. HALF FAST: Combat Wing, .29-.35
PERDIDO: Record FF, .19
SHOREBOAT: RC Boat, .09
If you lose in combat, build Half Fast.

18. PAACKHORSE: PAA Load FF .15.
AIRNOCKER: Scale, FF .049.
What model hit the jackpot? Airknocker—the Champ.

19. TRAVEL AIR 2000: U/C Scale .23-.29.
RESCUE CRAFT: RC Boat for .09-.29.
RAMROD 250: Contest FF, .049.
Greatest contest free flight in history—Ramrod.

20. FIERCE ARROW: Stunt, U/C .35.
WRECKTANGLE: ½A FF.
BREATHLESS: ½A Radio.
Unique trio—each brilliant design in its class.

1. GIMLET: RC Low wing .049.
ROYONO: Contest FF A&B.
So low wings RC are new? Gimlet started it all!

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24. Aero Bat, Snoopy, Seagull
25. Seven-Eleven, Hi-Start, Grumman F3F-3
26. Corsair, Gyro-Glider, Santanita
27. Flamingo, Upstart
28. Pacificoaster, Me-109
29. Cougar, '55 Nordic Winner, Dizzy Boy
30. Great Lakes Trainer, Triple Threat RC
31. Hi-Fli, Supermarine, Jumbo
32. Mig-15, Fifinella, Coquette
33. Skyraider, Dunwoody's Nordic, Flexi-Bull-It
34. Corben Super Ace, Cessna 310, Profile Lightning
35. Dyna-Jet Mig, Gramps
36. Stunt Trainer, ABC Robin, Blitzen
37. Victor Scout, Supermarine 508
38. SE-5, Curtiss Robin, Nobody
39. Rearwin Speedster, Stunt Wing, Rambler
40. Mustang, Bi-gone, Gliders 5
41. Triple Threat, Veto, A-Bomb

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15-watt bulb with a charge rate of 60ma for 5 hours. The use of light bulbs for dropping the voltage is sometimes more convenient than trying to find a large resistor having the proper ratings. A DC milliammeter can be inserted between the lamp bulb and the battery, taking care to use a meter with the proper range.

• • •

CLUB NEWS

Last month we mentioned that Fred Dunn of the Larks had designed and successfully flown a new low wing model known as the Astro-Hog. This month it can be said that this ship is well on its way to becoming a top contest winner. Last Fall, Bob Dunham and Fred kicked off the flying of this ship by taking several first places. Even Howard Bonner was impressed enough with the Astro's performance to build one. This may be the beginning of a new era in RC plane design.

• • •

The Larks report that South Africa is hot on RC since Bonner and Palmer made their tour. The most popular set-up is a Deltron or CG RT-1 single channel receiver in a Live Wire Champion, followed by CG 5-channel equipment in Smog Hogs. Shows what a little advertising will do. To say that some of the Larks are ambitious is putting it mildly. Douglas Stephens has scaled up a king sized PT-17, of 12 sq.-ft. area, from a small plastic model. A homemade 6-channel receiver will operate three trimmable servos.

• • •

Before leaving the west coast we'll hit the East Bay Radio Controllers, based in Oakland, California. Glenn Carter of that club, holds the record for point-to-point flying with a distance of eight miles. This flight lasted 12 minutes, giving a ground speed 40 mph. This was done with the help of a tail wind, but it is a pretty respectable speed for that distance. Glenn will try next for 13 miles, although rumor has it that with the size of his wing tank he should be good for over 20 miles. The EBRC Carrier reports on an RC boat contest held last fall. Contest winners included quite a few well known RC plane contest winners, indicating the versatility of the builders in that area. Highlights of the event were large and unusual live steamers, a five-foot sternwheeler, a 64" Cruiser with home built 4-cylinder engine and a 5-foot tugboat which required two men to place it in the water. Don Blessing of the EBRC has test flown his 8-channel Ascender, employing flaps which extend over 67 degrees. Take-offs and landings are claimed to be out of this world as Don eases the flaps up and down with a Bonner trimmable servo.

• • •

Our latest RC job is a profile combat model, a semi-scale version of the Curtiss Observation, 0-52, has the following specs: span 44", weight 23 ounces, Elfin diesel, Citizenship compound escapement, B & S Transistor Power Converter, six pencells for total power requirements, and a transistor RK-61 receiver. This ship was designed to allow combat flying without the risk of too much work being put into the plane. Construction is of all wood, with only the under side of the wing being paper covered.

• • •

The controversy still goes on as to just what the rules should be for rudder only, single channel, multi-channel etc. Here is what the EBRC thinks about the subject. Rudder only should include engine control and RC gear should be limited to single-channel equipment. They feel that the use of engine control will provide for

smoother flights, a safe means of losing altitude and increase the number of maneuvers. In the Intermediate or Mickey Mouse event, all you can get on a single channel is allowable. Multi-channel is self-explanatory. They also prefer the removal of the build-it-yourself limitation and the center circle in the spot landing event. A good landing should be the prime consideration and on this we fully agree. We have seen many so called good spot-landings that would have wiped out a full-size ship. The flier actually crashes his ship just to get closer to the center, with no thought given to good flying performance.

Mr. William Roosa, Anthro. Dept., U.N.M., Albuquerque, N.M., points out that the term rudder-only refers to a single control and not how it is operated. Bill feels that single-channel should specify the number of controls and that multi-channel should be termed Multi-channel-multi-control.

"The question remains as to how to divide single channel," he states. "I am in favor of having a class for single channel with 1 or 2 controls, and one for single channel with 3 or more controls. Since two controls on one channel are very practical and can be had without too much expense, they constitute a logical class. The simplest single-channel, 2-control set-up involves rudder control with up elevator using a compound escapement. Somewhat more complicated are systems using rudder and motor control. Either should be permitted in this class. It seems that the purpose of a rudder-only class is to provide for those with limited time, money and/or experience.

"Rudder only is made obsolete by modern equipment. Permitting two controls in the single-channel class would make this a very interesting event and bring out a lot of new ideas on simple effect control systems," Roosa continues. "Rudder-only freezes us to a very unrealistic set-up which has no counterpart in real aircraft. Practically speaking, a single channel 2-control class and a multi-channel-multi-control class would just about eliminate any need for the intermediate or MM class."

• • •

Looks like one of the top east coast clubs, the DCRC group, finally got the jump on the west coast group as far as different flying is concerned. They call it a Flyathon and the goal is to see how long the club members can keep a plane in the air—not necessarily the same one. The next plane up must be airborne before the other plane sets down. Next month we'll let you know how this new idea worked out.

• • •

NEW ITEMS

This is a correction on a recent report of the amount of current drawn by the new Deltron transistorized receiver. The Deltron 109 idles at ¾ma and rises to 4ma upon receipt of a signal. The transmitter idles at 8-9ma and goes to 18ma when the key is pressed. Incidentally, the transmitter must be capable of at least 90% modulation and the tone should be between 600 and 1,000 cycles, for maximum range.

• • •

Picture shows the new Wavemaster receiver by Aristo-craft. This American-built receiver measures 2" square, is 1¼" high, in the box, and weighs but 2 ounces. Additional features are the printed-wiring chassis, single tuning and adjusting control, a 4ma plus relay current change and the ability of the circuit to use a fairly wide variety of sub-miniature hard tubes. Filament drain, depending upon tubes used, can vary from 28ma to 80ma. Price of the completely built and tested receiver is $19.95 and the kit, also complete with tubes and relay is $15.95.

• • •

Another receiver this month is the Citizenship TC-465, a transistorized version of their famous 465mc receiver. The circuit was given in our last month's column and now for some data on the receiver itself. Needless to say this receiver is still not available in kit form, due to construction problems of UHF circuits. The TC-465 measures 1¾" x 1¾" x 3" and weighs 3 ounces, complete with relay and protective aluminum mounting base. Relay current change has been greatly increased and the receiver is guaranteed to "fly out of the box." A pre-production model flown by Leon Shulman tied for 1st in the rudder only event at the '57 Nats. Price is $26.95, provision is made for an external antenna for boat work and the TC-465 will operate with the regular Citizenship 465mc transmitters. Sensitivity is greater in the TC-465.

• • •

Have release on sub-miniature socket wrench set as produced by Desco Manufacturing Co., Glendale, Calif. The wrenches are 1¾" long and can be had in a permanent handle or for interchangeable use in a special handle. Fit nuts from 5/64" to ¼" and come in sets of five or 7 wrenches, or they can be had separately. See your dealer or write to the manufacturer at 551 W. Glen Oaks Blvd., in Glendale.

• • •

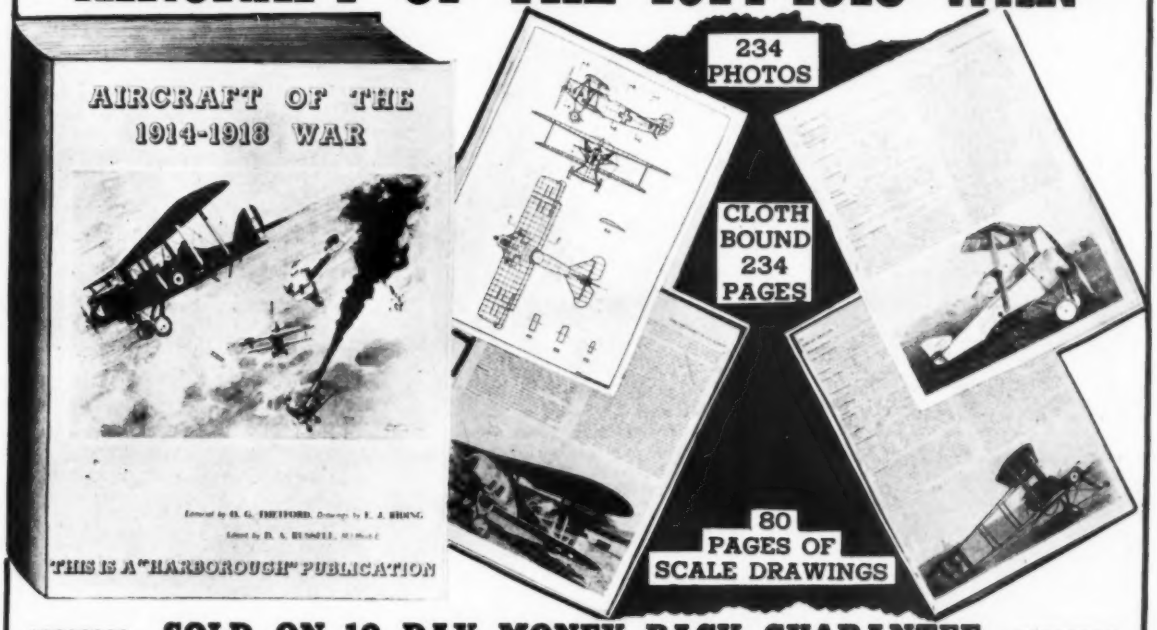
Also dope on the new Ectron Products Company (Box 393, Smyrna, Ga.) units. The actuator is the Ectron Multi-Compound Escapement, furnishing unlimited elevator power as well as rudder and motor control, on a single channel. A printed wiring switch can operate any elevator servo and will furnish self neutralizing or trim type operation. Operation of the 2-ounce unit is from a 3-volt source and the conventional rubber strands. Price is $11.95. The stick type control box is suited for Bonner, Babcock and other cascaded systems to give left, right, up, down and a fifth position. Measuring 2" x 2" x 4", the price of the control box is $14.95. We've witnessed many flights with some of the original Ectron equipment.

• • •

Radio control dates back well before World War One. Let's really go back.

(*Continued on page 60*)

"AIRCRAFT OF THE 1914-1918 WAR"



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Over 2,000 years ago they had electric batteries! Archeologists have discovered the remains of electric battery jars in the vicinity of Baghdad. Uncovered about 20 years ago, the batteries consisted of earthen jars with 1" diameter copper cylinder inserted vertically. Inside the copper cylinder, closed at the bottom, was a slender iron rod. The electrolyte was probably citric acid. The copper was soldered with a 60/40 tin-lead alloy, the same as is most commonly used today. The individual cell stood about 6 or 7 inches high.

• • •

Lafayette Radio, 165-08 Liberty Avenue, Jamaica, N. Y. can supply most of the transistors listed in British and European circuits. These transistors are of the OC70 series and sell for from $2.00 to $2.25. One of the new units, the OC76, has a collector current rating of 250ma, enough to drive an actuating device directly.

• • •

The CG Electronics Corporation, 15000 Central East (note new address), Albuquerque, New Mex. now has a completely transistorized line of receivers, including an 8-channel simultaneous unit. It should be noted that the fully transistorized receivers are sold ready built and tested while the parts kit utilizes a 1AG4 tube for the detector. Multi-channel receivers are available from 2 to 8 channels. Their T-5 transmitter (5-channel) and T-8 transmitter (8-channel simultaneous) feature stability of the audio tone within 2 cps over the useful range of the batteries.

• • •

Spaulding & Company, of 49 Pearl Street, Hartford, Conn. is marketing their Model K-1 receiver for $22.50. This German-built unit measures 1⅜" x 1½" x 3¾" weighs four ounces complete with relay and case and will operate on from 30 to 75 volts of plate supply. Up to 10ma relay current change may be had, making this receiver a good bet for driving an actuator directly. The hard tubes used are commercially available in this country, as is the tuning eye tube which makes the use of a meter for tuning unnecessary.

M.A.N. at Work

(*Continued from page* 4)

manager, and two people to handle registration and office. Nine major event categories require as many event managers. Then there are 14 event directors, and 14 people on special committees, such as housing, scale judges, trophies, etc. This adds up to 41 harried people who spend their vacations muttering to themselves. At the 1957 Willow Grove Nationals AMA could not field more than 18 to 20 people at one time!

As this is written, early in December, AMA must begin the annual trophy drive. This can't be done without knowing what events will be held at Glenview. Chicago-area Nationals always break the attendance records; it is quite possible for more than 2,000 entrants to sign up.

In the Memorandum, it was suggested that by-laws limit events to 25-30 and that the Contest Board be responsible for their selection; that the number of events be set by using a minimum entry in each event based on the locale. Thus, taking the 38 events at Willow Grove as an example, and using the arbitrary figure of 75, the 38 events would be reduced to 28 for Glenview. Based on past attendance, Glenview and Willow Grove would be matched in the number of events, as would be Dallas and Los Alamitos, in Calif. And, finally, the breakdown of events, according to major categories, would be determined by a percentage based on a three to four year trend. For instance, 60% of the events might be assigned to free flight, 10% for control-line, and so on.

• • •

► What events would be eliminated by this minimum entry number system? Well, the Memo mentions "such events as indoor stick and cabin, also control-line and free flight flying scale, radio control intermediate, scale and pylon racing, as well as helicopter, clipper cargo, and junior jet PAA Load—all having less then 75 entries in 1957."

What happens from here on in, is anyone's guess. After the 1957 meet there was much yakking in club circles about the horrendous combination of free flight classes, with ungentle hints that only the Contest Board members should make such decisions. Now that Headquarters has quickly handed this hottest of all potatoes to the CB members, MAN at Work doubts that the Board and/or Executive Council, and all of Humpty Dumpty's men will put the pieces together again before the 1958 Nationals. If a decision is reached, chances are overwhelming that it will be a bad one. So many possibilities, so many conflicting opinions. Something must be done. Can anything be done?

• • •

► It took exactly three days for Pan American World Airways to react to the AMA proposal. Since the Memo was dated November 12, and Pan Am's answer November 15, and allowing one day for the mail. Pan Am's response was instantaneous and, therefore, all the more interesting. PAA Load International and American Classes are dead! Speaking for the air line, Dallas Sherman, father of the PAA Load events, signified fullest, promptest co-operation in solving the Nationals problem. But who would expect the stand-by, well-attended events to be axed, with PAA Load jet, and clipper cargo maintained?

While this dramatic action reduces the number of events by two, it indicates the difficulties in the proposal to base events on the numbers of entrants from preceding years. This column has beefed about freak events detracting from the important basic events, as witnessed by the free flight combination last year. Yet, can it be said that free flight, for example, be given such great support? When control-line scale is to be killed? Of course, not. It is just too easy to compete in two free flight classes and too many ships can be flown in double events. Suppose, further, that events were to be adjusted year after year. Would the 1965 Nationals be all free flight? If magazines followed general modeling trends blindly, you would have seen nothing but control-line stunt and scale models for the past ten years.

Some wise compromise will have to be sought.

• • •

► About those Gotha plans: historian-draftsman, Willis Nye, says first time anywhere, except for British magazine, Aeronautics, during WW 1. Nye worked from official AF notes and sketches made in 1918 during rebuilding of a captured Gotha . . . to the thousands of kids and teachers who ask for airplane pix, a 96 page book (with 3-views, too), U.S. Aviation Today, 1957; by National Aviation Educational Council, 1025 Connecticut Ave., NW, Washington, D.C. At 50c—terrific!

Exciting News for Every Modeler! Perhaps the cost of building and operating your own complete R/C models has stopped you, like thousands of others, from enjoying the incomparable thrills of radio-control. Now, for the first time, complete packaged R/C is available at budget prices—from the world's most respected manufacturer of quality radio equipment and pre-fabricated model kits!

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Boat Kit only, $16.95—complete with propeller, etc.
Deluxe fittings, $9.95

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A breeze to assemble! Simple, perfect-fit parts make this kit especially ideal for the new R/C enthusiast. It features authentic deck and superstructure of die-cut mahogany plywood; one-piece, high-impact molded styrene hull; and chrome-plated marine hardware, realistic in every detail. Easiest-driving hull for electric propulsion. Best of all, it's priced to fit the most modest pocketbook.

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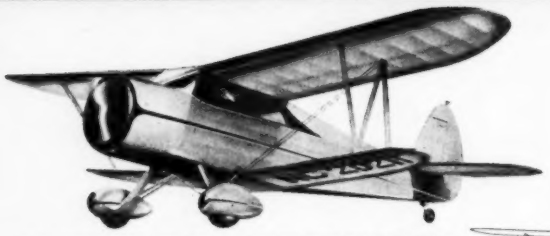

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For "½A" Engines — .035 to .074

An unusual addition to our line of 1" Scale Championship designs. The "Waco" is easy to adjust and an unusually stable and high performance craft. As a Controline, its scale appearance and perfect proportions team up to make a fine flyer for everyday or Contest Flying Scale events.

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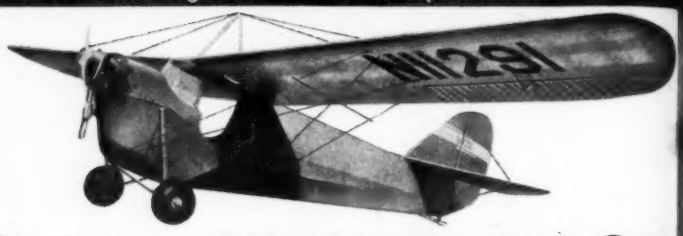

AERONCA "C-3"

For ½A Free-Flight — Controline 1" Scale — 36" Wingspan

.020 to .051 Engines

This kit now joins other Berkeley 1" Flying Scale designs, a series which has won this event at the Nationals consecutively since 1938. Structurally simple, the "C-3" can be assembled and flown in a few days time. Flies well with high or low power free-flight or controline. Plans show both types.

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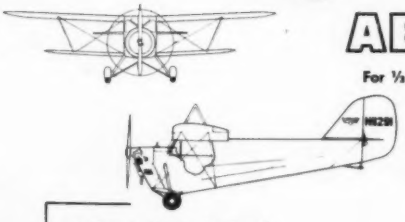

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CESSNA L-19 "BIRD DOG"

36" Wingspan

Two seat observation plane used on a large scale in Korean War by the U.S. Army and the U.S. Marines. A large number of these are used by National Guard units. Powered by 213 h.p. Continental—130 m.p.h.

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STINSON SENTINEL "L-5"

33½" Wingspan

Two place liaison and observation plane first flown in 1941. 1731 L-5's were built during World War II. Still in use by the U.S.A.F., Italian Air Force, and the Japanese Air Defense Force. Powered by 190 h.p. Lycoming. Maximum—129 m.p.h.—112 m.p.h. Cruising.

PIPER "SUPER CRUISER"

35" Wingspan

$2.95 Kit No. 4-9

Three place cabin monoplane originally introduced as the "Cruiser" in 1940 with 75 h.p. then as the "Super Cruiser" after World War II, with 104 h.p. and then in 1948 as the four place "Family Cruiser". "Super Cruiser" had a maximum speed of 115 m.p.h.

CESSNA "180"

35" Wingspan

Four place cabin monoplane introduced in 1953 using the same wing as the "170" but with a re-designed fuselage and tail unit. Powered by a 225 h.p. Continental Engine. Maximum speed is 165 m.p.h.

$2.95
Kit No. 4-7

FAIRCHILD 24 "RANCHER"

36½" Wingspan

First produced in 1933 as a two-seater, in 1938 was introduced as a four place model using either a radial Warner engine or an in-line Ranger. Military version was known as the YC-61 "Forwarder" by the U.S.A.F. and the "Argus" by the R.A.F. Production resumed for business use after the war. 132 m.p.h.

Kit No. 4-5 **$2.50**

"AERONCA SEDAN"

34" Wingspan

Featured as a lunkplane, plans show pontoon details for those desiring the added thrill of water take-offs. Finished model is really spectacular

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"SUPER CADET"

35" Wingspan

Known as the "Interstate Cadet" before World War II and currently built by Call Aircraft Co. Two place—power was 65 h.p. It is now stepped up to 125 h.p. with an increase in maximum speed to 135 m.p.h.

Kit No. 4-6 **$2.95**

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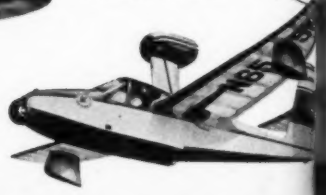
Kit No. 4-2

STINSON VOYAGER "150"

.34" Wingspan

Originally built by Stinson division of Consolidated Vultee. Added to the Piper line in 1948. Four place 165 h.p. Franklin engine. 145 m.p.h. maximum speed.



COLONIAL "SKIMMER"

(Not for Rubber Power) 33½" Wingspan

The hull design is perfect for realistic water take-offs.

Three place amphibian with retractable landing gear. Nose wheel protrudes when retracted to serve as a bumper. Powered by 125 h.p. Lycoming, 125 m.p.h.

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The "Buhl Pups" have been immortalized as one of the finest light planes ever designed. A number of full scale "Buhl Pups" are being rebuilt by "old timers". This truly different design makes an exceptionally realistic and fine flying model.

Each year from all over North America the top Scale Model Builders come to the Nationals to fly in the exacting Flying Scale Event where models are judged for workmanship, authenticity and most of all flying performance! Against this keenest of competition Berkeley's Flying Scale designs have won 1st or 2nd in this event

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As much fun as it is to fly—it may be built as a free-flight, radio or controline design. Stable and easily adjusted as a free-flight, rugged and fun to fly. As a radio design-ideal for rudder and motor control, with the data on plans. A truly practical scale design for rough and ready controline flying.

CESSNA "170"

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Radio Control—Free-Flight—PAA-Load
.35 to .35 Engines—72" Span—2" Scale

Controlling your "Cessna 170" by Radio is a thrill you will not forget! Perfect in scale, rugged, stable in all attitudes, yet responsive in control, with good wind penetration qualities. The gear location is ideal for extended take-off runs. The larger than average size makes it easier to control in windy weather.

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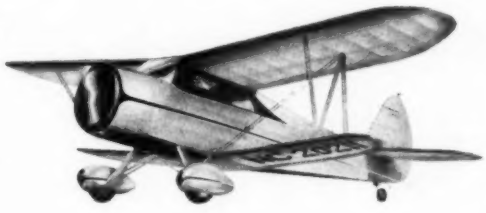
"WACO CABIN"

For Radio Control—Free-Flight—Controline

1½" Scale —52" Wingspan

For .14 to .29 Engines Kit No: 3-6 **$9.95**

The 1½" scale "Waco" spans 52". Weight with all radio equipment installed is 4½ lbs. 630 sq. inches wing area. Model is designed for multiple control through compound escapement systems. In flight it is very stable and easily controlled with rudder only type installations. Rudder, elevators, motor and steerable tailwheel may be actuated. Radio equipment is removable as a unit for convenience.



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"BEAVER"

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This high aspect-ratio Canadian Bush Flying type aircraft now is in use by the U.S. Air Force. As a scale design, it is well proportioned and capable of contest performance. In R.C. and Controline flying, its long moment arm make it ideal for spot landings with motor control, Metal Cowl, Full Size Plans, etc.

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BIG 1½" SCALE

54" WINGSPAN FOR .09 to .19 ENGINES

- **Adjustable Ailerons** for manually setting trim
- **Laminated Structure** stronger, lighter, easier
- **Operating Wing Flaps** radio or controline actuated

$7.95

Here is the latest scale "Cessna" that is a "natural" for radio control. The big proto ship takes-off and lands with "hands-off" control. The model handles just as easy! It's a model builders dream ship!

The kit is very complete in true Berkeley tradition with prefabricated wood parts, silkspan, landing gear and hardware, plus the super-detailed plans and full-colored authentic decals found only in Berkeley Kits.

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"HELIOPLANE" $3.95

Variable Camber Wing for Two-Speed Radio Control Flying

For .049 to .14 Engines — 39" Wingspan — 1" Scale

"Helioplane" is first model that permits use of scale flaps. Depress 10 degrees for free flight; 25 degrees for slow speed control by radio; or raise 5 degrees for high speed.

"KING SIZE FLYING SCALE"

1½" Scale — 54" Wingspan

AERONCA "C-3"

For Radio Control — Free-Flight — Controline

.099 Engines R.C. — .074 Free-Flight — .15 Engines Controline

Kit No: 3-5 **$5.95**

Designed for rudder control with optional elevator and motor control. Ailerons can be set for trim. All equipment easily accessable through the cabin. Controline version is fun to fly with motor control.

NAVION "Super 260"

2" Scale — 68" Wingspan **For .33 to .65 Engines**

This beautiful scale replica of the famous "Navion" is a fast, rugged and truly different R.C. or Free Flight design, easily adapted to Controline Flying. Thrill to its flashing performance and smooth response. As a free-flight, it will give you experience and confidence in low wing designs. Big, roomy, and well engineered, it will set the pace wherever it's flown. Easy to build!

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.15 to .25 Engines—71" Span—2" Scale

"PIPER CUB J-3" $9.95

The "Piper Cub J-3" needs no introduction. Most famous of all light aircraft, it's a natural for R.C. or Free-Flight flying. The six foot span permits the extra R.C. installation that you dream about. This is a rugged, detailed, flight proven design. Full-Size Plan with R.C. installations, Authentic Decals, etc.

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This perfect scale R.C. design may be built as a Free-Flight or Controline version if desired. Full Size Plans cover special details for all three versions. Flaps, elevator, rudder, motor and nose gear may be operated by R.C. Ailerons for trim, cabin door access to Radio, Highly Pre-fabricated, Authentic Decals.

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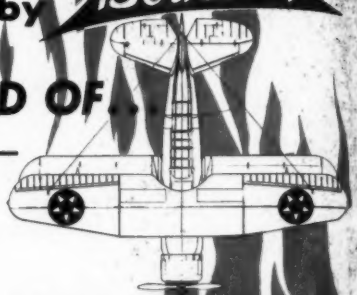

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Designed by Lon A. Gow

- Formed Metal Ring Cowl
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CURTISS SBC-3 NAVY DIVE BOMBER "HELLDIVER"

Controliner

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STUNT FLYING...
DIVE BOMBING BALLOONS...

authentically detailed

...ive of the powerful and dramatic biplane fighter ... of the early 30's, the fabulous SBC-3 "Helldiver" by ... was a carrier based dive bomber, and the forerunner ... the "Helldiver" of World War II. Powered by 750 hp. Pratt & Whitney Twin Wasp, it was one of first of its kind with retractable gear. Carried belly tank, bombs, machine guns.

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Unfold the plan and you will crave to build it. Everything is detailed, no chance of error. Formers and ribs fall in place, align themselves. The structure is light, yet very rugged where necessary. The upper wing is wire mounted for greater strength, flexibility. Symmetrical airfoil sections for advanced stunting. Rounded edge planking strips around the fuselage fit one against the other, no tapering, fitting. Wing ribs are cap-stripped, may be all-sheet covered if you so desire. Servo operation of flaps, hook and motor control.

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But most of all it's the way it performs on the end of the lines — the way it seems to anticipate the model's needs. Running a bit faster here — slowing down a bit there to help the model perform smoothly the most difficult maneuver.

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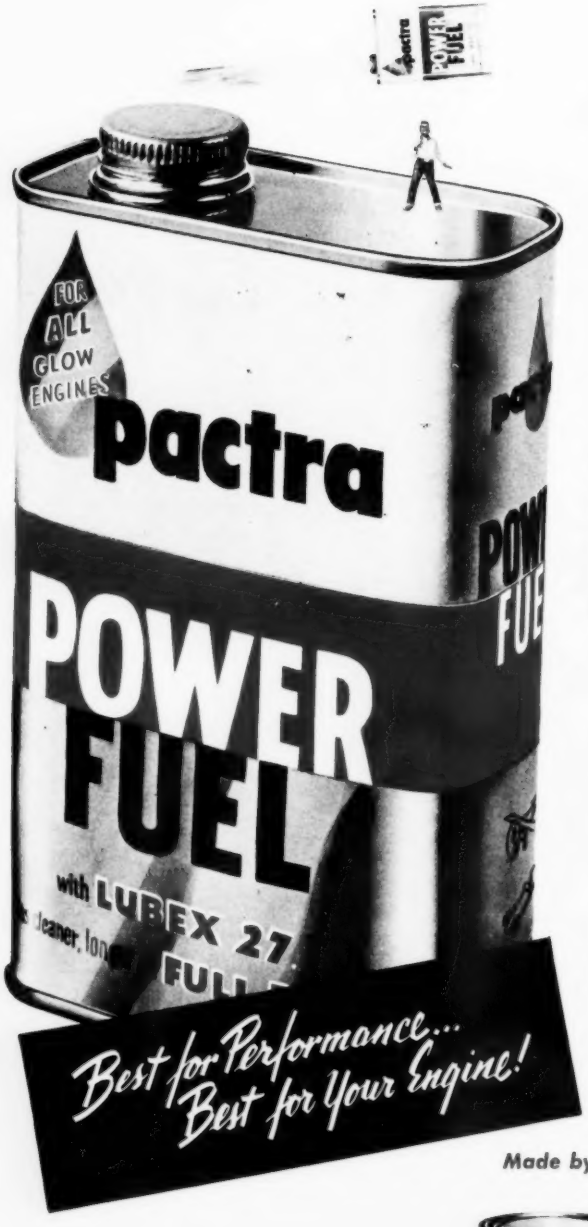

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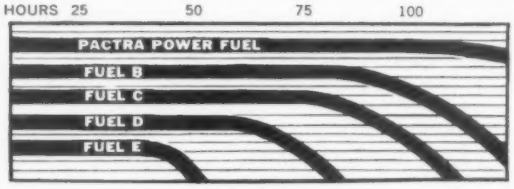

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